# CD Stereo Radio Recorder

**AZ1009/00/05/17**

**AZ1010/00/01/04/05/10**
**/11/11H/14/17**

Service
Service
Service

# Service Manual

COMPACT disc DIGITAL AUDIO

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**CLASS 1**
**LASER PRODUCT**


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PHILIPS

# TECHNICAL SPECIFICATION

## *General:*

Mains voltage : 220V-230V / 50Hz for /00 /04 /14
230V-240V / 50Hz for /05 /10
110V-127V / 220V-240V /50Hz switchable for /01 /11 /11H
120V / 60Hz for /17

Battery : 9V ( 6xR20 )

Power consumption : ≤ 15W at maximum output power, ( ≤ 11W at 1/8 $P_{max}$ )
≤ 5W (typ. 2W) with source switch in *tape/off*

## *Amplifier:*

Power stage protection : temperature and shortcircuit

Output power mains : 2 x 1,4$W_{rms}$ -1dB at 4Ω D=10%
battery : 2 x 2$W_{rms}$ -1dB at 4Ω D=10%
Headphone : 3,5mm stereo jack, ≥ 20mW at 32Ω (≡ 0,8V at 32Ω ) D=10%

Frequency response : 30Hz - 16kHz ( typ. at volume set to -20dB, CD mode 0dB signal level ⇒use SBC429 )

Tone control DBB : +12dB ±3dB at 100Hz ( volume set to -20dB )

## *Tuner:*

| | FM | MW |
|---|---|---|
| Tuning range | 87,5 - 108 MHz | 522 - 1607 kHz<br>(520 - 1730 kHz for /17) |
| IF | 10,7 MHz ± 20 kHz | 468 kHz ± 3 kHz |
| Sensitivity Mono: 26dB S/N, m=30% | ≤ 4 µV ( ≤ 2µV typ.) | ≤ 4mV/m (≤ 1,5mV/m typ.) |
| -3 dB limiting point | ≤ 5 µV ( ≤ 2µV typ.) | |
| AFC capture range | ±300kHz typ. | |
| Distortion | ≤ 7% (≤ 1% typ.)<br>RF=1mV Δf=75kHz | ≤ 7% (≤ 2,5% typ.)<br>RF=100mV/m m=80% |
| Image rejection ratio | ≥ 20dB (26dB typ.) | ≥ 28dB |
| Channel separation at 1kHz | ≥ 20dB (25dB typ.) | |

## *CD:*

To be measured on phone socket with 100kΩ load.

Frequency response : 30 - 16.000 Hz -4dB
Signal/Noise ratio : ≥ 60dB
Distortion : 0.2% typ. at 1 kHz
Channel difference : ≤ 3dB at 1 kHz
Channel crosstalk : 40dB typ.
De emphasis : 0 or 15/50µs switched automatically by subcode on the disc

Laser
Output power : 500µW
Wave length : 780 ± 20 nm

## *Recorder:*

To be measured on phone socket with 100kΩ load.

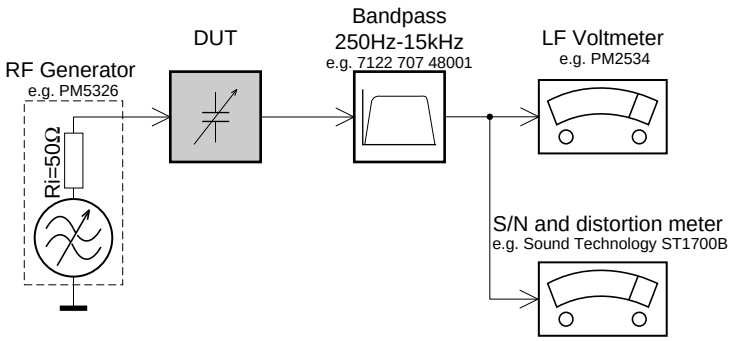
Tape speed : 4,76cm/s ±3%
Wow & Flutter : ≤ 0,5% weighted
Winding speed : 120s for C60 cassette
Erase / Bias system : permanent magnetic erase head / AC 65 ±5kHz
Distortion at 250 nWb/m : ≤ 7%
Signal/Noise ratio (FF weighted) : ≥ 40dB
(A - weighted) : ≥ 43dB
Channel difference at PB : ≤ 5dB
Channel difference overall : ≤ 5dB
Channel separation : ≥ 15dB at 1kHz
Track separation : ≥ 55dB at 1kHz

Frequency response IEC I
Pb : 125Hz - 8000Hz (within 8dB)
overall : 250Hz - 6300Hz (within 8dB)

**note: set is not prepared to play or record *IEC II Chrome* cassettes!**

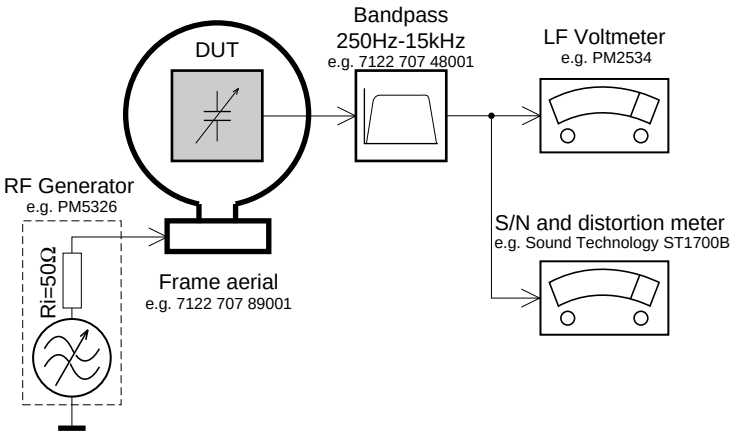
# MEASUREMENT SETUP

### *Tuner FM*




Use a bandpass filter to eliminate hum (50Hz, 100Hz) and disturbance from the pilottone (19kHz, 38kHz).

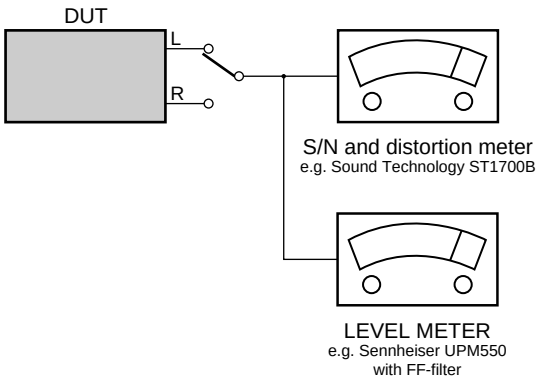
### *Tuner AM (MW,LW)*




To avoid atmospheric interference all AM-measurements have to be carried out in a Faraday´s cage.
Use a bandpass filter (or at least a high pass filter with 250Hz) to eliminate hum (50Hz, 100Hz).

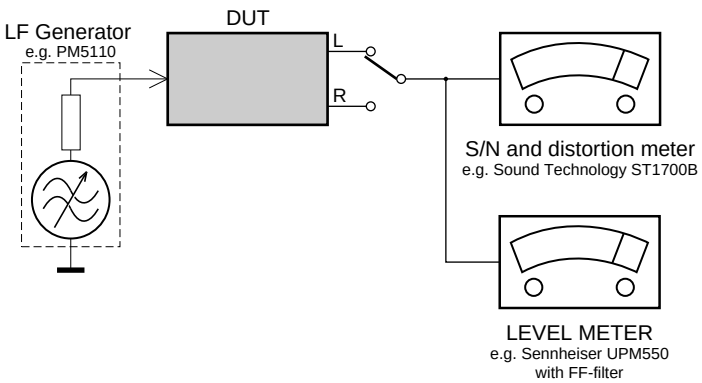
### *CD*

Use Audio Signal Disc SBC429 4822 397 30184
(replaces test disc 3)

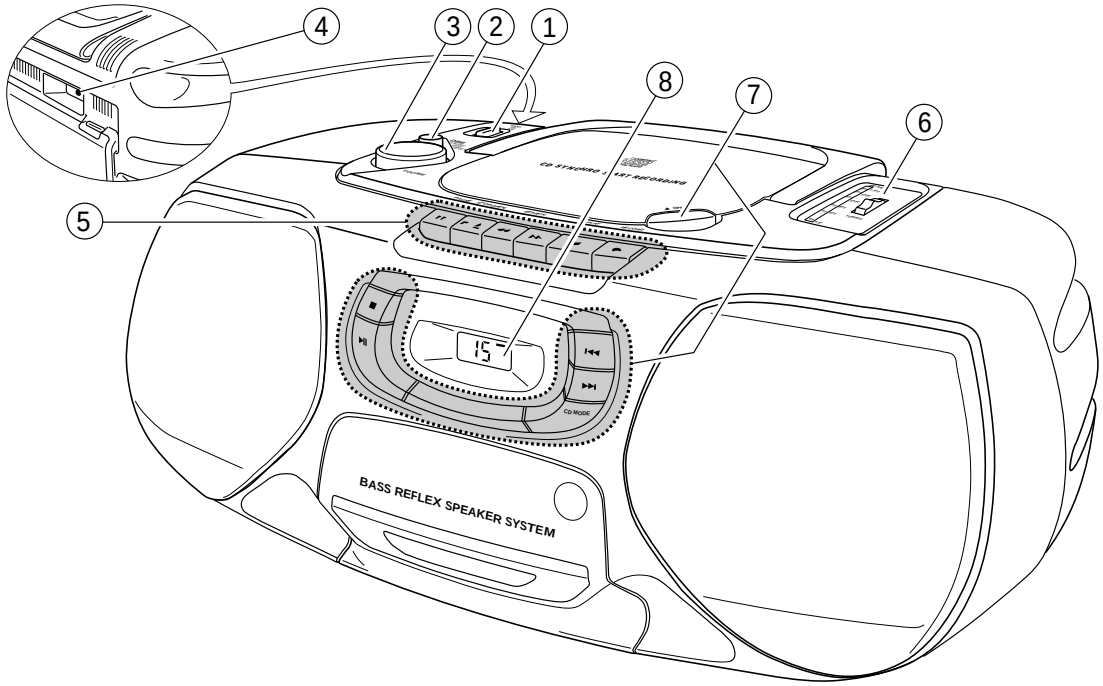



### *RECORDER*

Use Universal Test Cassette **Fe** SBC420 4822 397 30071



# CONNECTIONS & CONTROLS




**BASIC FUNCTIONS**

① POWER:
CD, TAPE, BAND ....selects the sound source

② DBB .....enhances the bass

③ VOLUME .....adjusts the volume level

④ 🎧 .....3.5mm headphone socket (back of the set)

*Note: Connecting the headphones will switch off the speakers.*

⑤ **CASSETTE RECORDER**

PAUSE ⏸ .....interrupts recording or playback

STOP·OPEN ☐ ⏏ ..stops the tape and opens the cassette compartment

SEARCH ⏩ .....rewinds the tape

SEARCH ⏪ .....fast forwards the tape

PLAY ◁ .....starts playback

RECORD ○ .....starts recording

**RADIO**

⑥ TUNING .....tunes to radio stations

① BAND: FM, MW ...selects the wave band

⑦ **CD PLAYER**

⏏ OPEN .....opens the CD compartment

☐ .....stops CD play and erases the program

▷⏸ .....starts and interrupts CD play

⏭ .....skips and searches forward

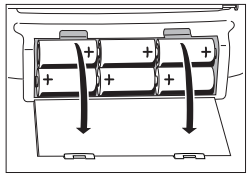
⏮ .....skips and searches backward

CD MODE.....selects the different CD playing modes and programs tracks

⑧ Display

English

## Batteries (optional)

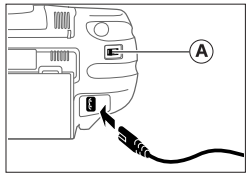


Open the battery compartment of the set and insert 6 batteries, type **R20**, **UM-1** or **D**-cells (preferably alkaline).

Remove batteries if they are flat or if the set is not going to be used for a long time.

***Batteries contain chemical substances, so they should be disposed of properly.***

## Mains




1 Check whether the mains voltage as shown on the type plate corresponds to your local mains voltage. If it does not, consult your dealer or service organisation. ***The type plate is located on the bottom of the set.***

2 If the set is equipped with a VOLTAGE selector Ⓐ, set this selector to the local mains voltage.

3 Connect the mains cable to the AC MAINS socket and the wall socket. This switches on the mains supply. ***The mains cable is inside the battery compartment.***

The battery supply will be switched off when the set is connected to the mains. To change over to battery supply, pull out the plug from the unit's AC MAINS socket.

To disconnect the set from the mains completely, remove the mains plug from the wall socket.

*For users in the U.K.: please follow the instructions on page 2.*

***Environmental information***

All redundant packing material has been omitted. We have done our utmost to make the packaging easily separable into three mono materials: cardboard (box), polystyrene foam (buffer) and polyethylene (bags, protective foam sheet).

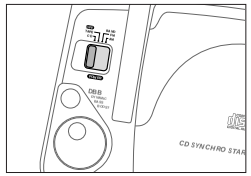
*Your set consists of materials which can be recycled if disassembled by a specialized company. Please observe the local regulations regarding the disposal of packing materials, exhausted batteries and old equipment.*





English

## Switching the set on and off

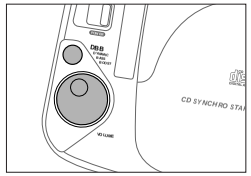


Set the POWER slider to the desired sound source: CD, TAPE, or BAND (for radio).

The set is switched off when the POWER slider is set to OFF/TAPE and the keys of the tape deck are released.

*Note: If you use batteries, switch the set off after use. This will avoid unnecessary power consumption.*

## Adjusting volume and sound

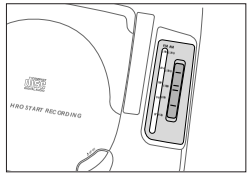


Adjust the volume using the VOLUME control.

Increase and decrease the bass level by pressing DBB.

The bass level can also be emphasised if you place the set against wall or shelf. Do not cover any vents; leave sufficient room around the unit for ventilation.

## Radio – tuning to radio stations

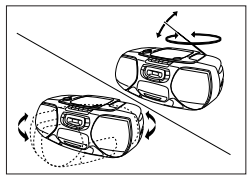


1 Set the POWER slider to FM or MW to select the desired wave band.

2 Tune to the desired radio station by using the TUNING wheel.

**Improving RADIO reception**

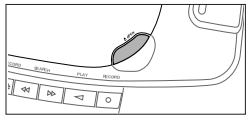
For **FM** stations, pull out the telescopic antenna. To improve the signal, incline and turn the antenna. Reduce its length if the signal is too strong (very close to a transmitter).



For **MW** stations, direct the built-in antenna by turning the whole set. The telescopic antenna is not needed.

English

## Playing a CD

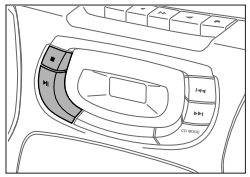


**1** Set the POWER slider to CD.

**2** Press ⏏ OPEN to open the CD compartment.

**3** Insert an audio CD (printed side up) and close the CD compartment.
→ The CD player starts and scans the contents list of the CD. Then, the CD player stops. Display indication: the total number of tracks.

**4** Press the ▷II button to start CD play.
→ Display indication: the current track number.



**5** Press the □ button to stop CD play.
→ Display indication: the total number of tracks.

You can interrupt CD play by pressing ▷II. Continue CD play by pressing the button again.
→ Display indication: the current track number (flashing).

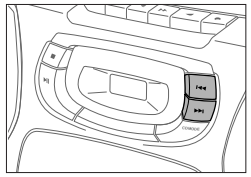
*Note: CD play will also stop if:*
*– you open the CD compartment,*
*– the end of the CD is reached, or*
*– you move the* POWER *slider.*

If you make a mistake when operating the CD player, or if the CD player cannot read the CD, the display shows E or no. (See "TROUBLESHOOTING".)

If you press ▷II and there is no CD inserted, the display shows no.

English

## Search backward ⏮ and forward ⏭



**Selecting another track**
Briefly press the ⏮ or ⏭ button once/several times to skip to the beginning of the current, previous or subsequent track(s).
*During CD play:*
CD play continues automatically with the selected track.
*When CD play is stopped:*
Press ▷II to start CD play.
→ Display indication: the selected track number.

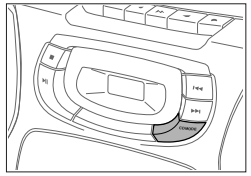
**Searching for a passage during CD play**

**1** Hold down the ⏮ or ⏭ button to find a particular passage in a forward or backward direction.
→ CD play continues at a low volume.

**2** Release the button when you have reached the desired passage.

*Note: In the different CD modes or when playing a program, searching is only possible within the particular track.*

## CD MODE: Shuffle and Repeat



**1** During CD play press CD MODE repeatedly to cause the display to show the different playing modes.
→ **SHUFFLE**: All tracks of the CD (or program) are played in random order.
→ **SHUFFLE REPEAT ALL**: All tracks of the CD (or program) are played repeatedly in random order.
→ **REPEAT**: The current track is played repeatedly.
→ **REPEAT ALL**: The entire CD (or program) is played repeatedly.

**2** After 2 seconds of flashing display indication, CD play starts in the chosen mode.

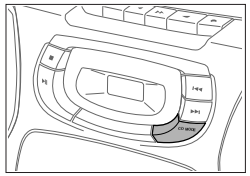
**3** To return to normal CD play, press CD MODE until the display indication disappears.

## CD PLAYER

English

### CD MODE: Programming track numbers

You can select a number of tracks and store these in the memory in the desired sequence. You can store any track more than once. A maximum of 20 tracks can be stored in the memory.



**1** When CD play is stopped, select the desired track with ⏮ or ⏭.

**2** As soon as the number of the desired track is displayed, press CD MODE to store the track in the memory.
→ **PROGRAM** appears on the display. P lights up briefly, then the number of the stored track is shown.

**3** Select and store all desired tracks in this way.

**4** You can review your settings by pressing and holding CD MODE for more than 1 second.
→ The display shows all stored track numbers in sequence.

If you try to store more than 20 tracks, the display shows F.

### Playing the program

Press ▷II to play the program.

### Erasing the program

From the stop position, press □.
→ no lights up briefly, **PROGRAM** disappears and your program is erased.

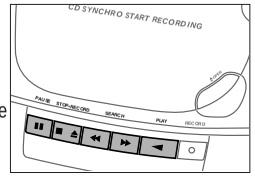
*Note: The program will also be erased if you:*
*– interrupt the power supply,*
*– open the CD compartment, or*
*– move the* POWER *slider.*



## CASSETTE RECORDER

English

### Playing a cassette




**1** Set the POWER slider to TAPE.

**2** Press STOP·OPEN □ ⏏ to open the cassette compartment.

**3** Insert a recorded cassette with the open side upwards and close the cassette compartment.

**4** Press PLAY ◁ to start playback.

**5** Press ▷▷ or ◁◁ to rewind or fast forward the tape.

**6** To stop the tape press STOP·OPEN □ ⏏.

*Note: The keys are released at the end of the tape.*

### General information on recording

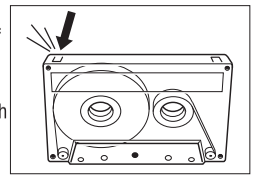
Recording is permissible insofar as copyright or other rights of third parties are not infringed upon.

For recording on this set you should use a cassette of the type NORMAL (IEC type I). This deck is not suitable for recording on cassettes of the type CHROME (IEC type II) or METAL (IEC type IV).

The recording level is set automatically. The controls VOLUME and DBB do not affect the recording.

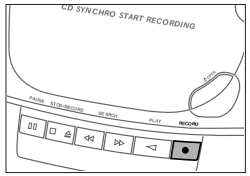
At the very beginning and end of the tape, no recording will take place in the 7 seconds during which the leader tape passes the recorder heads.

**Protecting tapes from accidental erasure**
Keep the cassette side to be protected in front of you and snap off the left tab. Now, recording on this side is no longer possible.



To record again on this side of the cassette, cover the opening with a piece of adhesive tape.

## Recording from the CD player – CD synchro start




**1** Set the POWER slider to CD.

**2** Insert a CD and, if desired, program the track numbers.

**3** Press STOP·OPEN □ ⏏ to open the cassette compartment.

**4** Insert a blank, unprotected, cassette and close the cassette compartment.

**5** Press RECORD ○ to start recording.
→ Playing of the CD or program starts automatically.

**6** For brief interruptions press PAUSE ⏸. Press the PAUSE ⏸ key again to resume recording.

**7** To stop recording, press STOP·OPEN □ ⏏.

*Note: the recording can be started from different positions:*
*– if the CD player is in pause mode, recording will start from this very position (use ⏮ or ⏭);*
*– if the CD player is in stop mode, recording will start from the beginning of the CD or program.*

## Recording from the radio

**1** Tune to the desired radio station (see "RADIO").

**2** Press STOP·OPEN □ ⏏ to open the cassette compartment.

**3** Insert a blank, unprotected, cassette and close the cassette compartment.

**4** Press RECORD ○ to start recording.

**5** For brief interruptions press PAUSE ⏸. To resume recording press the PAUSE ⏸ key again.

**6** To stop recording, press STOP·OPEN □ ⏏.







***WARNING***

***Under no circumstance should you try to repair the set yourself as this will invalidate the guarantee.***

If a fault occurs, first check the points listed below before taking the set for repair.

If you are unable to solve a problem by following these hints, consult your dealer or service center.

| Problem | Possible cause | Solution |
|---|---|---|
| **No sound, no power** | VOLUME is not adjusted. | Adjust volume. |
| | Headphones are connected. | Disconnect headphones. |
| | Mains cable is not securely connected. | Connect mains cable properly. |
| | Batteries are flat. | Insert fresh batteries. |
| | Batteries are inserted incorrectly. | Insert batteries correctly. |
| | Trying to change over from mains to battery supply without removing the plug. | Remove the mains plug from the unit's AC MAINS socket. |
| **No reaction to operation of any keys** | Electrostatic discharge. | Disconnect the set from power supply, reconnect after a few seconds. |
| **Poor radio reception** | Weak radio signal. | Direct the antenna for optimum reception. |
| | Interference caused by electrical equipment like TVs, computers, engines, etc. | Keep the radio away from electrical equipment. |
| **no or E indication** | The CD is badly scratched or dirty. | Replace or clean the CD. |
| | No CD is inserted. | Insert a CD. |
| | The CD is inserted upside down. | Insert CD with label facing up. |
| | The laser lens is steamed up. | Wait until the lens has cleared. |
| **The CD skips tracks** | The CD is damaged or dirty. | Replace or clean the CD. |
| | **SHUFFLE** or **PROGRAM** is active. | Switch off **SHUFFLE** or **PROGRAM**. |
| **Poor cassette sound quality** | Dust and dirt on the heads, capstans or pressure rollers. | Clean heads, capstans, and pressure rollers. |
| | Use of unsuitable cassette types (METAL or CHROME) for recording. | Only use NORMAL type cassettes for recording. |
| **Recording does not work** | Cassette tab(s) may be snapped off. | Apply a piece of adhesive tape over the opening. |

# WARNINGS & SAFETY

**(GB) WARNING**
All ICs and many other semiconductors are susceptible to electrostatic discharges (ESD). Careless handling during repair can reduce life drastically.
When repairing, make sure that you are connected with the same potential as the mass of the set via a wristband with resistance. Keep components and tools at this potential.

**(F) ATTENTION**
Tous les IC et beaucoup d´autres semi-conducteurs sont sensibles aux décharges statiques (ESD). Leur longévite pourrait être considérablement écourtée par le fait qu´aucune précaution nést prise à leur manipulation.
Lors de réparations, s´assurer de bien être relié au même potentiel que la masse de l´appareil et enfileer le bracelet serti d´une résistance de sécurité.
Veiller à ce que les composants ainsi que les outils que l´on utilise soient également à ce potentiel.

## ESD

**(D) WARNUNG**
Alle ICs und viele andere Halbleiter sind empfindlich gegenüber elektrostatischen Entladungen (ESD).
Unsorgfältige Behandlung im Reparaturfall kann die Lebensdauer drastisch reduzieren.
Sorgen Sie dafür, daß sie im Reparaturfall über ein Pulsarmband mit Widerstand mit dem Massepotential des Gerätes verbunden sind.
Halten Sie Bauteile und Hilfsmittel ebenfalls auf diesem Potential.

**(NL) WAARSCHUWING**
Alle IC´s en vele andere halfgeleiders zijn gevoelig voor electrostatische ontladingen (ESD).
Onzorgvuldig behandelen tijdens reparatie kan de levensduur drastisch doen vermindern. Zorg ervoor dat u tijdens reparatie via een polsband met weerstand verbonden bent met hetzelfde potentiaal als de massa van het apparaat.
Houd componenten en hulpmiddelen ook op ditzelfde potentiaal.

**(I) AVVERTIMENTO**
Tutti IC e parecchi semi-conduttori sono sensibili alle scariche statiche (ESD).
La loro longevità potrebbe essere fortemente ridatta in caso di non osservazione della più grande cauzione alla loro manipolazione. Durante le riparationi occorre quindi essere collegato allo stesso potenziale che quello della massa delápparecchio tramite un braccialetto a resistenza.
Assicurarsi che i componenti e anche gli utensili con quali si lavora siano anche a questo potenziale.

**(GB) AVAILABLE ESD PROTECTION EQUIPMENT :**

| | | |
|---|---|---|
| **anti-static table mat** | large 1200x650x1.25mm | 4822 466 10953 |
| | small 600x650x1.25mm | 4822 466 10958 |
| **anti-static wristband** | | 4822 395 10223 |
| **connection box** (3 press stud connections, 1MΩ) | | 4822 320 11307 |
| **extendible cable** (2m, 2MΩ, to connect wristband to connection box) | | 4822 320 11305 |
| **connecting cable** (3m, 2MΩ, to connect table mat to connection box) | | 4822 320 11306 |
| **earth cable** (1MΩ, to connect any product to mat or to connection box) | | 4822 320 11308 |
| **KIT ESD3** (combining all 6 prior products - small table mat) | | 4822 310 10671 |
| **wristband tester** | | 4822 344 13999 |

## SAFETY

**(GB)**
Safety regulations require that the set be restored to its original condition and that parts which are identical with those specified be used.
Safety components are marked by the symbol ⚠

**(F)**
Les normes de sécurité exigent que l`appareil soit remis à l`état d`origine et que soient utilisées les pièces de rechange identiques à celles spécifiées.
Les composants de sécurité sont marqués ⚠

**(D)**
Bei jeder Reparatur sind die geltenden Sicherheitsvorschriften zu beachten. Der Originalzustand des Gerätes darf nicht verändert werden. Für Reparaturen sind Originalersatzteile zu verwenden.
Sicherheitsbauteile sind durch das Symbol ⚠ markiert.

**(NL)**
Veiligheidsbepalingen vereisen, dat het apparaat in zijn oorspronkeliijke toestand wordt teruggebracht en dat onderdelen, identiek aan de gespecificeerde, worden toegepast.
De Veiligheidsonderdelen zijn aangeduid met het symbool ⚠

**(I)**
Le norme di sicurezza estigono che l´apparecchio venga rimesso nelle condizioni originali e che siano utilizzati i pezzi di ricambiago identici a quelli specificati.
Componenty di sicurezza sono marcati con ⚠

**(GB)** **DANGER**: Invisible laser radiation when open.
AVOID DIRECT EXPOSURE TO BEAM.

**CLASS 1**
**LASER PRODUCT**

**(S) Varning !**
Osynlig laserstrålning när apparaten är öppnad och spärren är urkopplad. Betrakta ej strålen.

**(DK) Advarsel !**
Usynlig laserstråling ved åbning når sikkerhedsafbrydere er ude af funktion. Undgå udsaettelse for stråling.

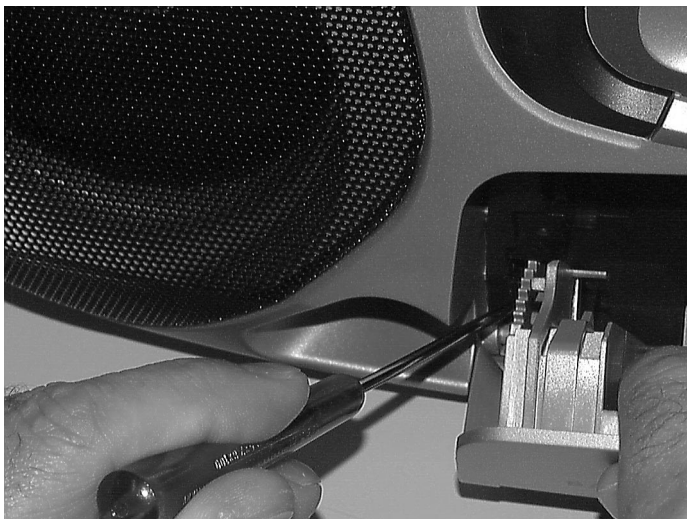
**(SF) Varoitus !**
Avatussa laitteessa ja suojalukituksen ohitettaessa olet alttiina näkymättömälle laserisäteilylle. Älä katso säteeseen !

**(GB)**
After servicing and before returning the set to customer perform a leakage current measurement test from all exposed metal parts to earth ground, to assure no shock hazard exists.
The leakage current must not exceed 0.5mA.

**(F)**
"Pour votre sécurite, ces documents doivent être utilisés par des spécialistes agréés, seuls habilités à réparer votre appareil en panne".

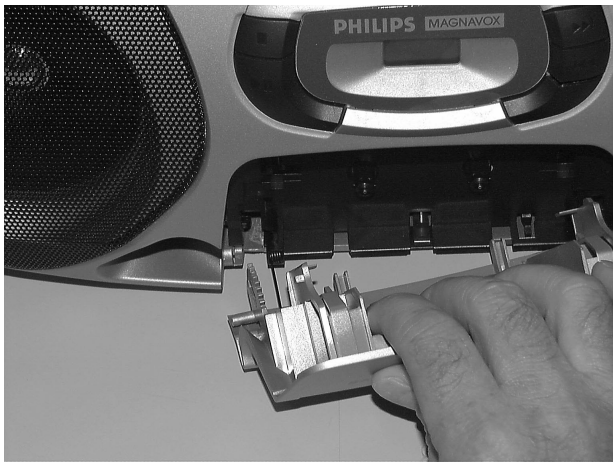
# DISMANTLING INSTRUCTIONS

## Dismantling of the Cassette Door



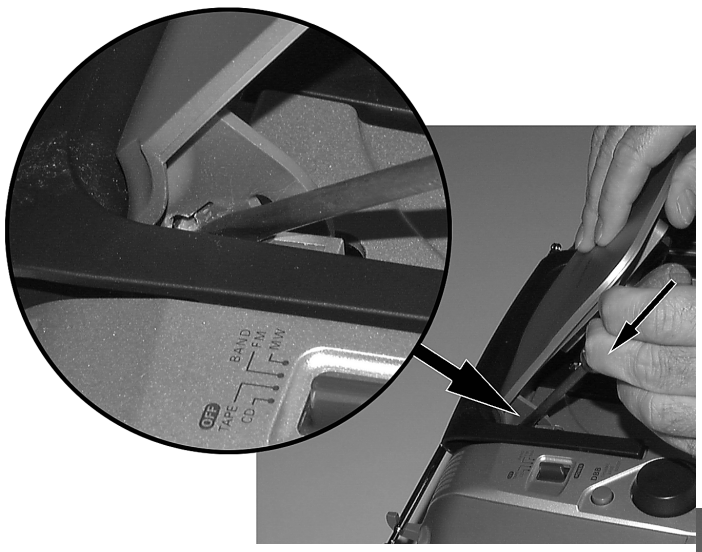
picture 1

- Open cassette door.
- Release left  catch by pressing it inwards with a screwdriver as shown in picture 1.
- Pull door on left side up as shown in picture 2.
- Right catch will now be released automatically.




picture 2

## Dismantling of the CD Door




picture 3

- Open CD door.
- Release left  catch by pressing it inwards with a screwdriver as shown in picture 3.
- Pull door on left side up as shown in picture 4.
- Right catch will now be released automatically.

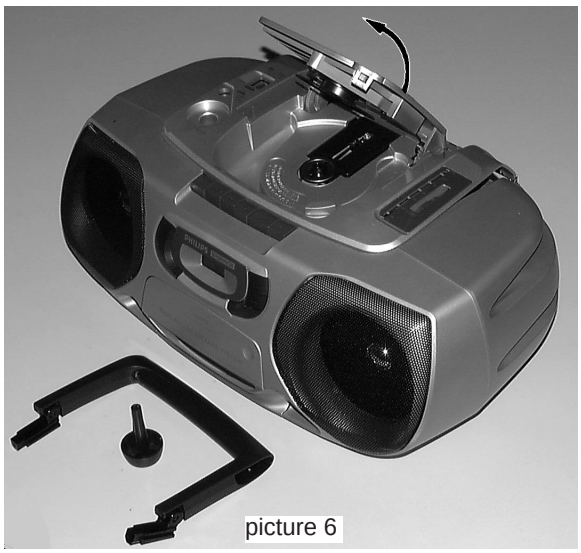
picture 4

# DISMANTLING INSTRUCTIONS

## Dismantling the Top Cabinet

- Loosen 6 screws as shown in picture 5.
- Remove handle by pulling it backwards.

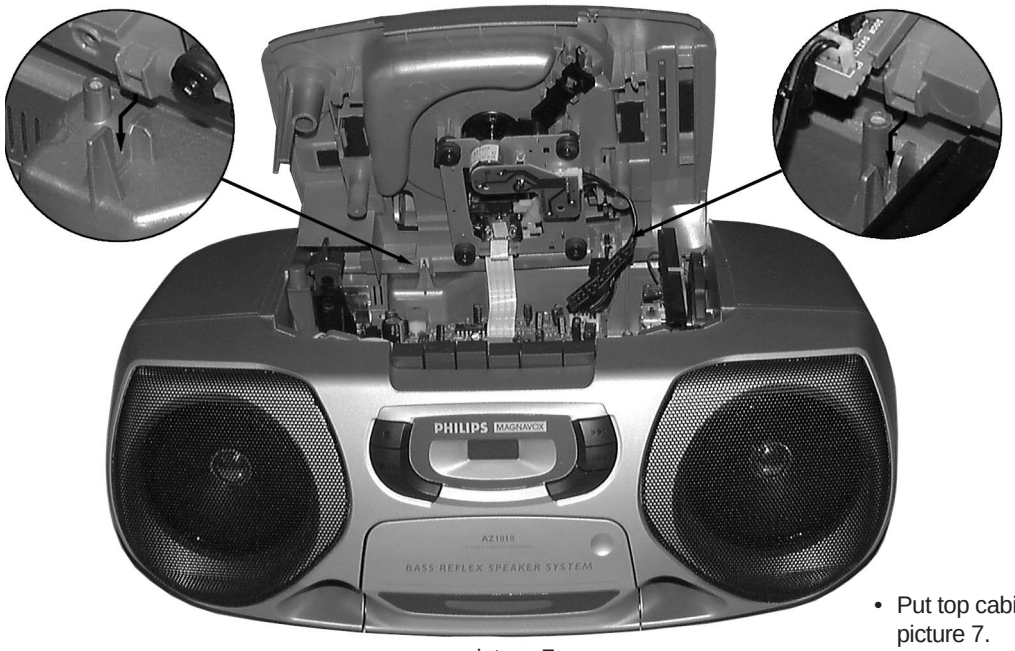
picture 5



picture 6

- Pull volume knob off.
- Pull Top cabinet on rear side up first.
- Move it backwards to release lugs on front side.
- Pull Top cabinet up.

**Attention: Take care of flex wire to CD drive!**

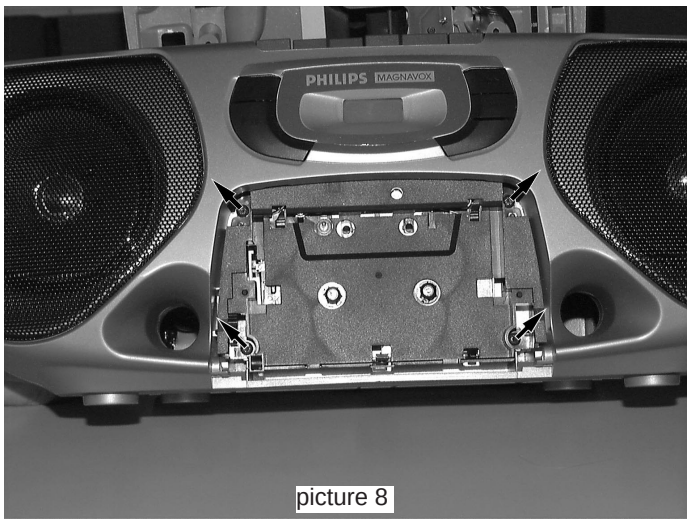



picture 7

- Put top cabinet in rest position as shown in picture 7.

# DISMANTLING INSTRUCTIONS

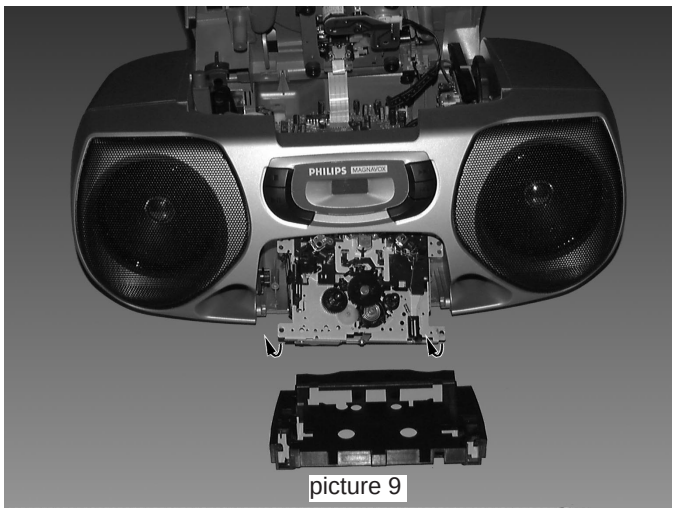
## Dismantling of the Tape Transport



picture 8

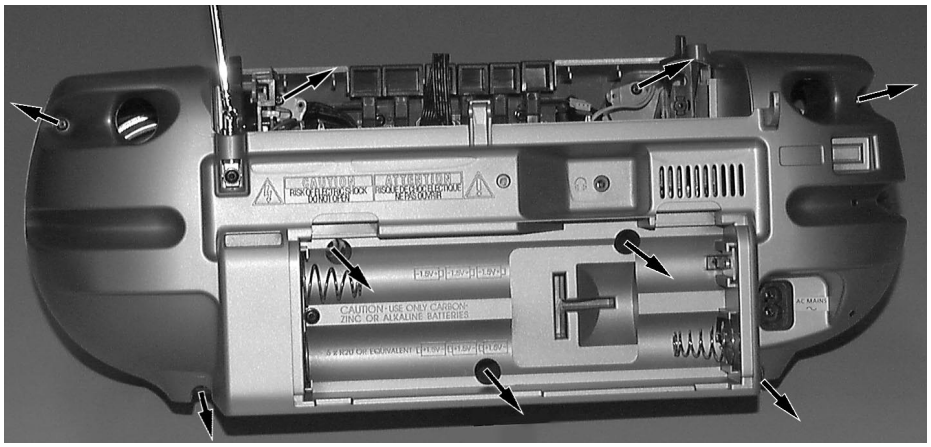
- Dismantle top cabinet as described page before.
- Remove cassette door as described in chapter 3-1.
- Loosen 4 screws as shown in picture 8.
- Put ornamental cover away.
- Fetch tape transport through cassette compartment out as shown in picture 9.

  For service position see chapter *SERVICE HINTS.*



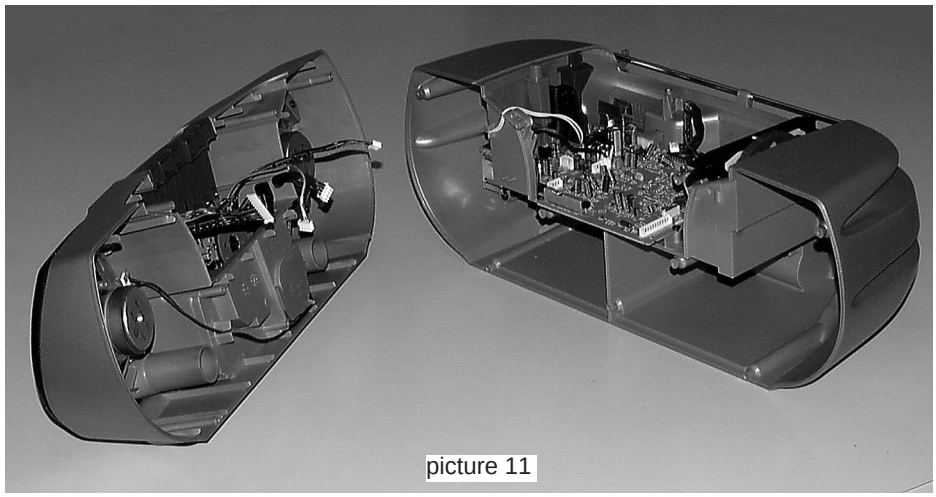
picture 9

## Separation Front - Rear Cabinet



picture 10

- Loosen 9 screws as shown in picture 10.
- Plug cables to front-board, tape transport and transformer off.
- Pull front- and rear cabinet apart.


picture 11

## SERVICE HINTS

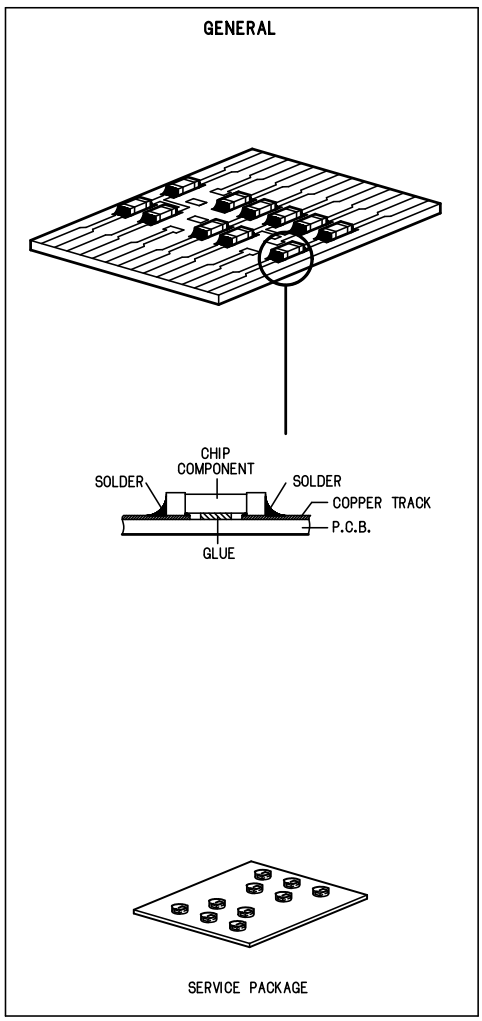
### SERVICE TOOLS

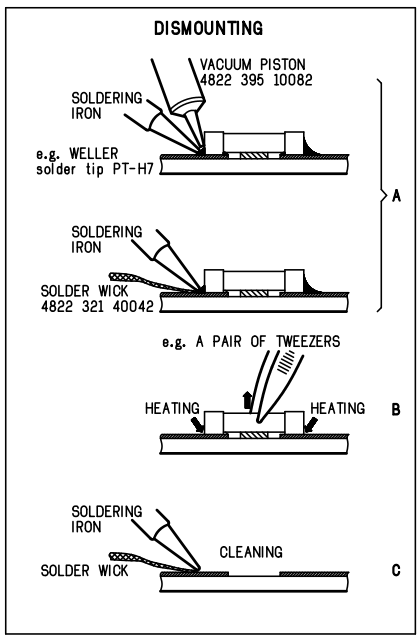
**TORX T10** screwdriver with shaftlength 150mm .....4822 395 50423
**TORX screwdriver set** SBC 163 .....4822 295 50145

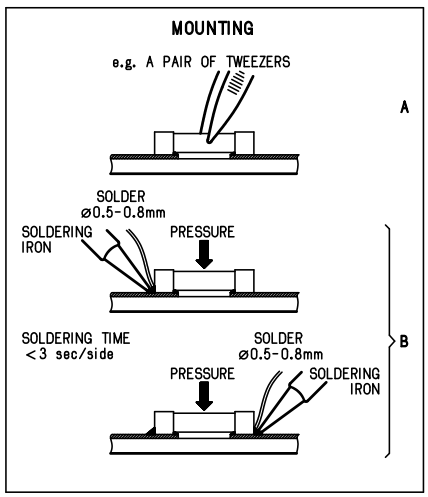
**Audio signal disc** SBC 429.....4822 397 30184
**Playability test disc** SBC444 .....4822 397 30245
**Test disc 5** (disc without errors) +
**Test disc 5A** (disc with dropout errors, black spots and fingerprints)
SBC 426/426A .....4822 397 30096
**Burn in test disc** (65 min. 1kHz signal at -30dB level without "pause") ...4822 397 30155

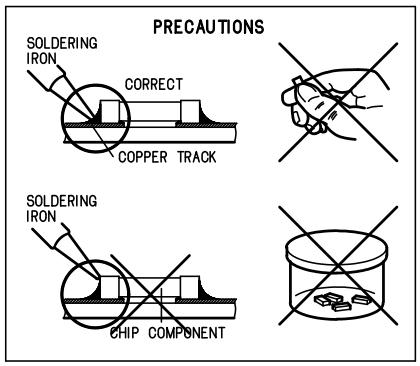
**Universal test cassette Fe** SBC 420 ..... 4822 397 30071

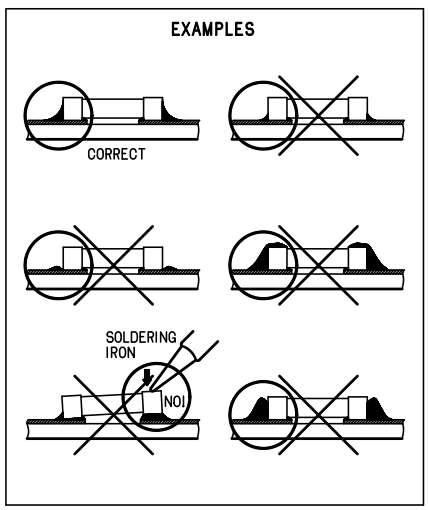
### HANDLING CHIP COMPONENTS



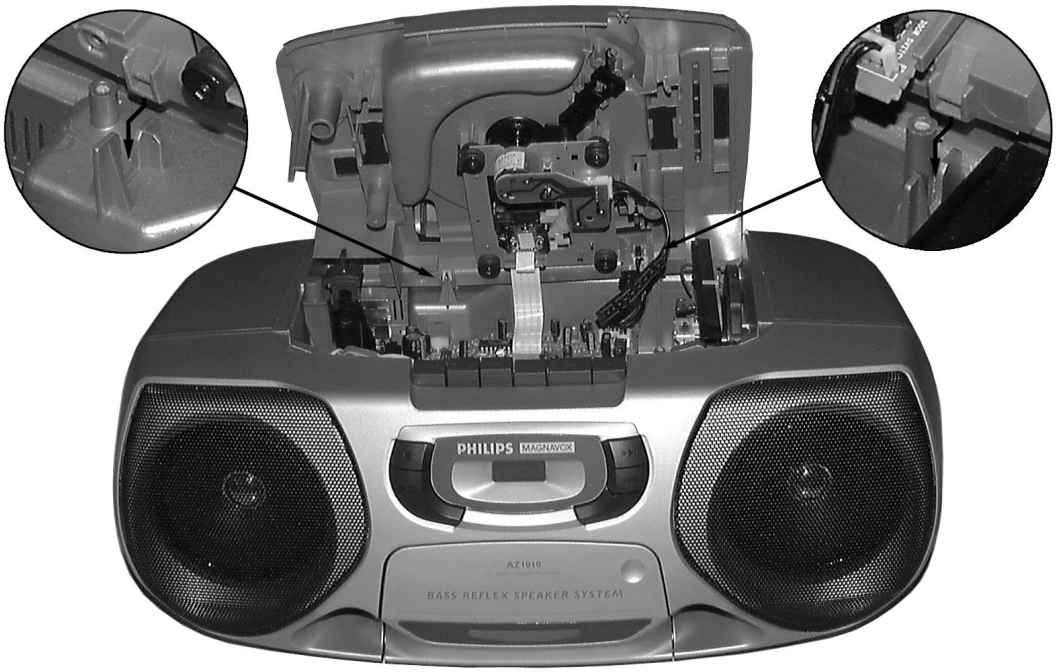



# SERVICE HINTS

## General Service position

For repairs on: CD failures
Rec/Pb-amplifier
Power-amplifier
Power supply
Tuner Board

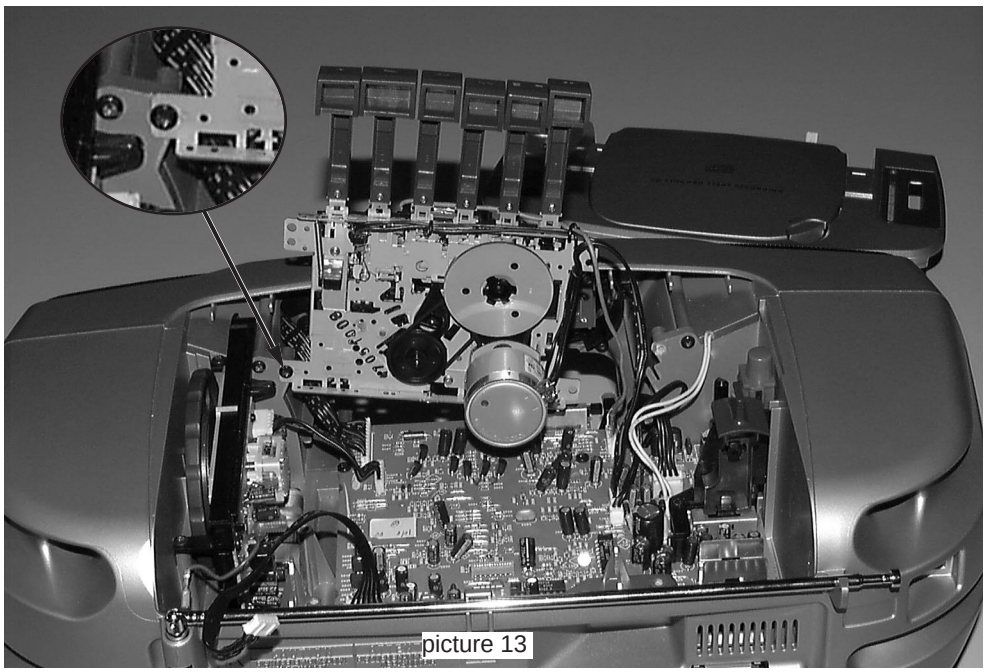



picture 12

## Service position Tape Transport

For repairs on the Tape Transport or for adjustment of the tape speed:

- Dismantle tape transport as described in chapter 3-3.
- Fix tape transport on cabinet with one screw as shown in picture 13.
- Connect cables on Combi Board again.

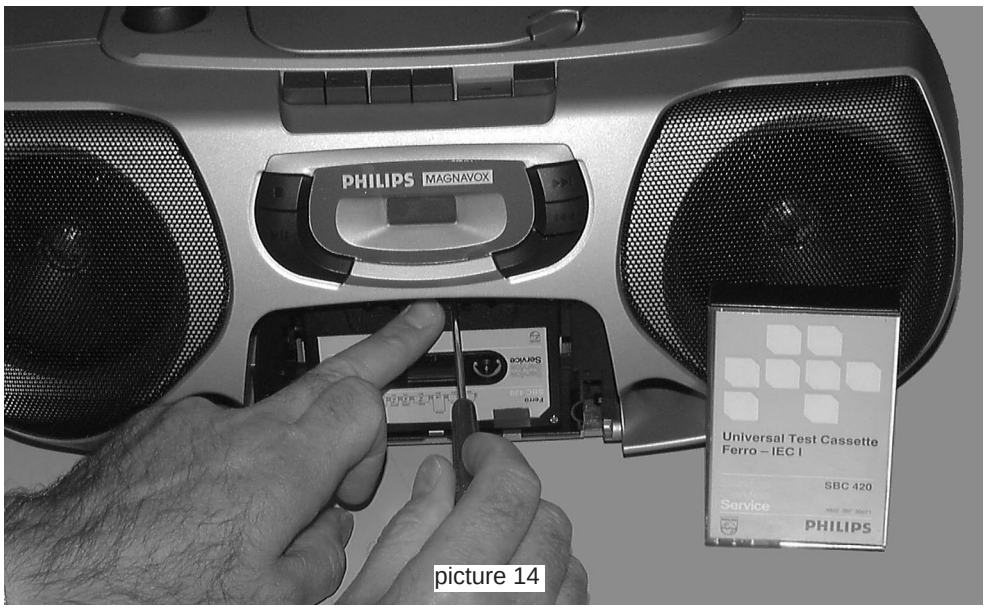


picture 13

# SERVICE HINTS

## Alignment of AZIMUTH

- Remove casstte door as described in chapter 3-1.
- Insert testcassette SBC420 (4822 397 30071) directly into cassette compartment and play 10kHz part.
- Adjust  right hand screw for max. output and left channel = right channel.

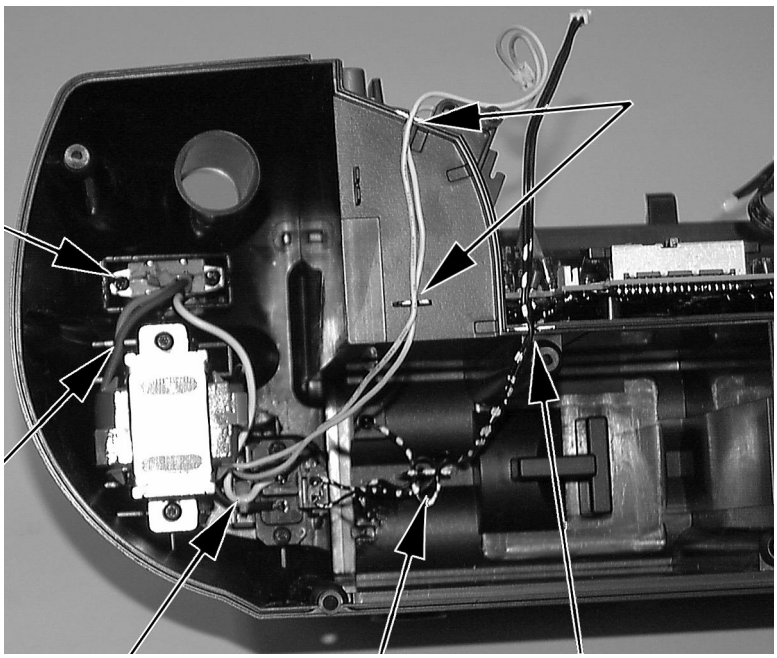



picture 14

## Details wire routing of mains transformer

Wire routing has to be carried out as shown in picture 15 in order to:

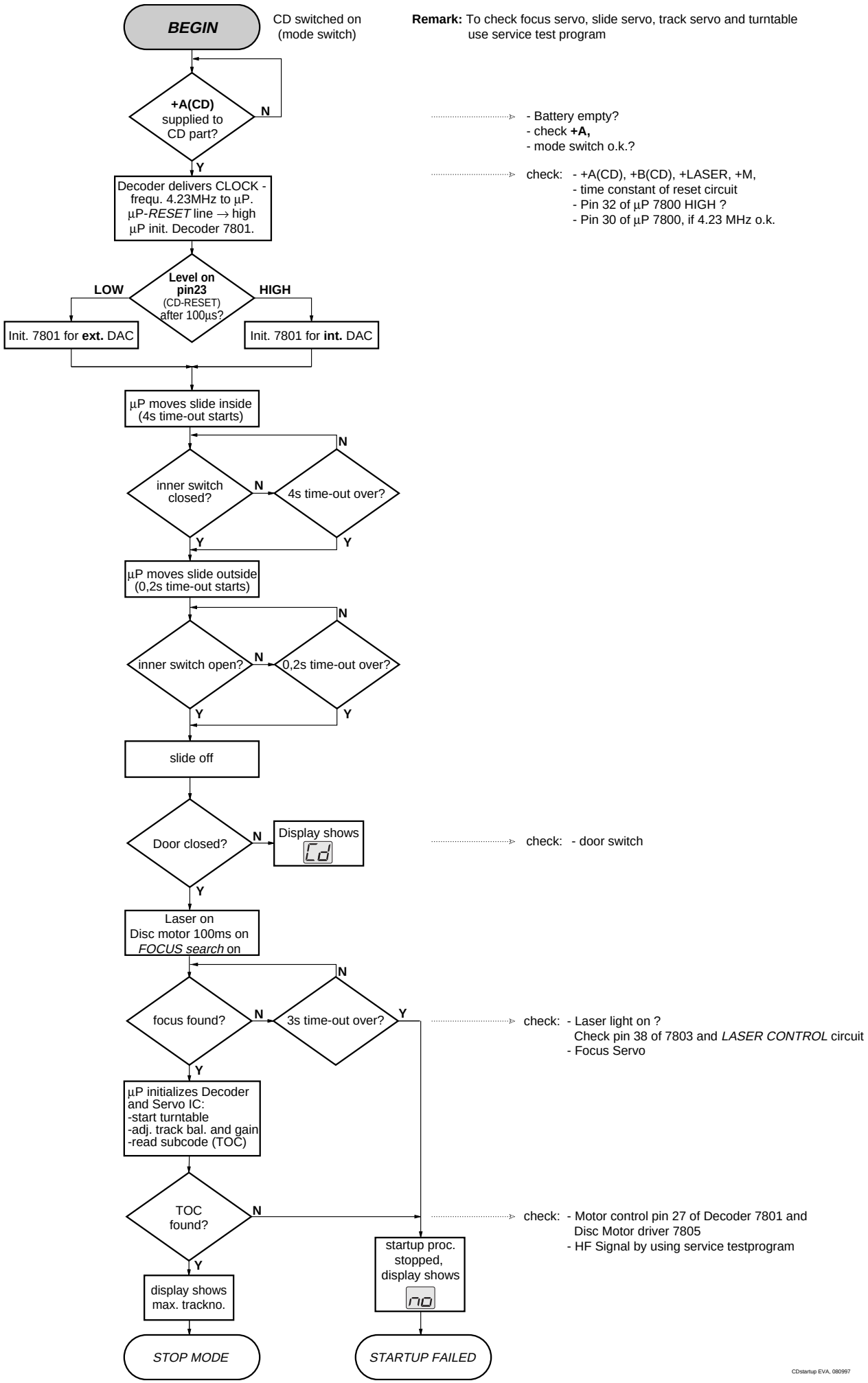
- fulfil safety requirements and
- obtain tight speaker boxes



picture 15

# CD STARTUP PROCEDURE




BEGIN
CD switched on (mode switch)
Remark: To check focus servo, slide servo, track servo and turntable use service test program
+A(CD) supplied to CD part?
N
Y
- Battery empty?
- check +A,
- mode switch o.k.?
Decoder delivers CLOCK - frequ. 4.23MHz to µP. µP-RESET line → high µP init. Decoder 7801.
check: - +A(CD), +B(CD), +LASER, +M,
- time constant of reset circuit
- Pin 32 of µP 7800 HIGH ?
- Pin 30 of µP 7800, if 4.23 MHz o.k.
Level on pin23 (CD-RESET) after 100µs?
LOW
HIGH
Init. 7801 for ext. DAC
Init. 7801 for int. DAC
µP moves slide inside (4s time-out starts)
inner switch closed?
4s time-out over?
µP moves slide outside (0,2s time-out starts)
inner switch open?
0,2s time-out over?
slide off
Door closed?
Display shows
Cd
check: - door switch
Laser on
Disc motor 100ms on
FOCUS search on
focus found?
3s time-out over?
check: - Laser light on ?
Check pin 38 of 7803 and LASER CONTROL circuit
- Focus Servo
µP initializes Decoder and Servo IC:
-start turntable
-adj. track bal. and gain
-read subcode (TOC)
TOC found?
check: - Motor control pin 27 of Decoder 7801 and
Disc Motor driver 7805
- HF Signal by using service testprogram
startup proc. stopped, display shows
no
display shows max. trackno.
STOP MODE
STARTUP FAILED
CDstartup EVA, 080997

# Pin-descriptions of CD ICs

## *SERVO PROCESSOR M62475FP*

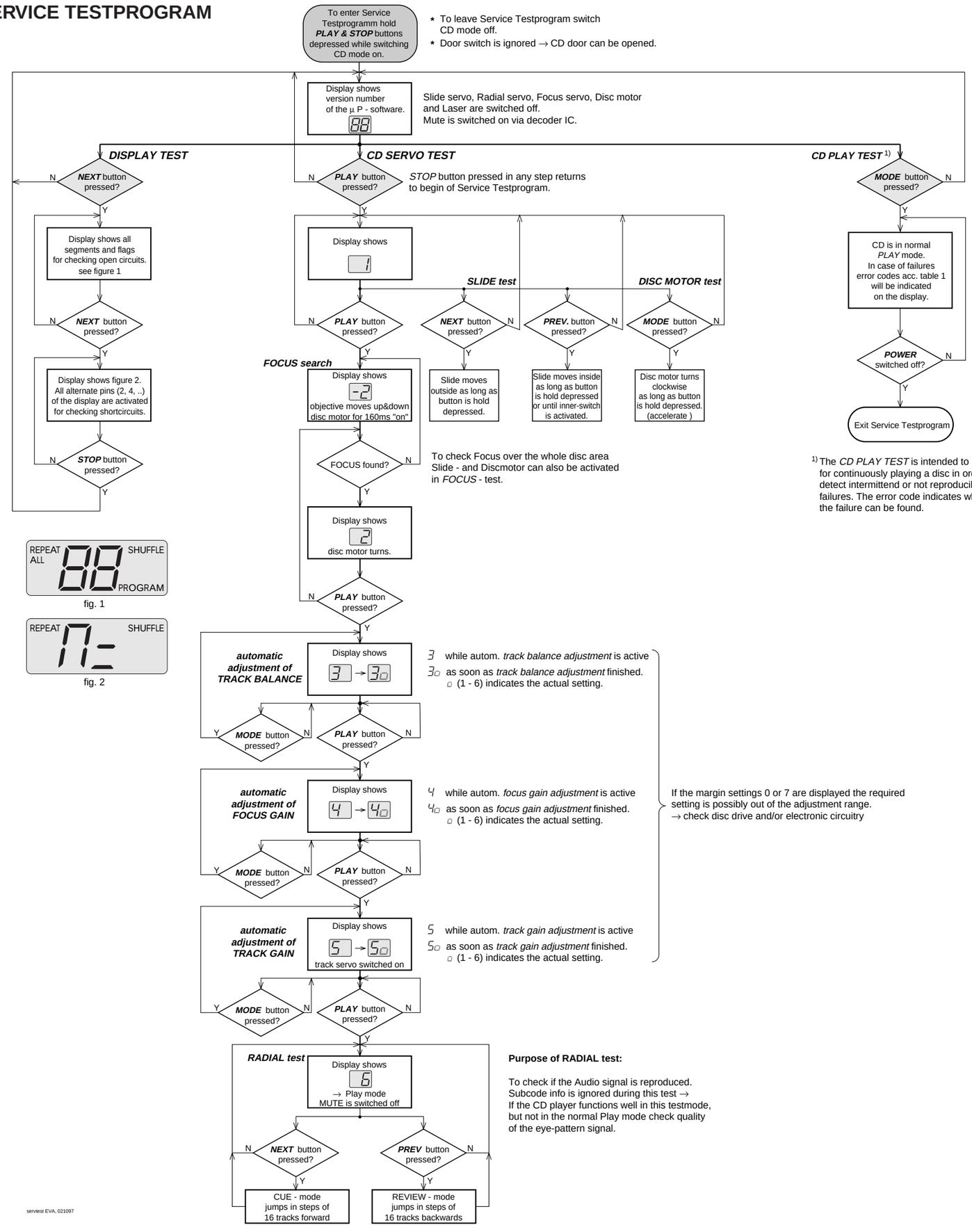
| *Pin* | *Name* | *Direction* | *Description* |
|---|---|---|---|
| 1-3 | A, B, C | Diode array → Servo processor | Current input ( central photo diode signal input ) |
| 4-5 | E, F | Diode array → Servo processor | Current input ( satellite photo diode signal input ) |
| 6 | SGT | Servo processor → Track error ampl. input | Signal generator output to track servo, sends 1700Hz for adjustment procedure |
| 7 | TE - | - | Inverting input of track error amplifier |
| 8 | TEGain | - | Gain control pin of track error amplifier |
| 9 | TG1 | - | Track Gain 1 - switch: controls the gain of the track servo amplifier |
| 10 | TE out | - | Track Error amplifier output |
| 11 | TC/Shock | - | Track Cross/Shock detector input |
| 12 | TS + | - | Non inverting input of track servo amplifier |
| 13 | TG2 | not connected | Track Gain 2 - switch: controls the gain of the track servo amplifier |
| 14 | TS - | - | Inverting input of track servo amplifier |
| 15 | TS out | Servo processor → Servo driver | Output of track servo amplifier |
| 16 | SS + | - | Non inverting input of slide servo amplifier |
| 17 | SS - | - | Inverting input of slide servo amplifier |
| 18 | Slide out | Servo processor → Motor driver | Output of slide servo amplifier |
| 19 | DET.FILTER | - | Pin for connection of DETection FILter capacitor of *ADJUST LOGIC* |
| 20 | BIAS | Servo processor → external electronic | Reference Voltage output Vcc/2 of internal BIAS-generator |
| 21 | GND | - | Ground connection pin ( negative supply ) |
| 22 | MLA/DIS | µP → Servo processor | Serial interface Microprocessor LAtch control / DIScharge control for adjustment |
| 23 | JP1/SG | µP → Servo processor | Serial interface Jump control line / Signal Generator input line for adjustment |
| 24 | MCK | µP → Servo processor | Serial interface Clock input line |
| 25 | MSD | µP → Servo processor | Serial interface Data input line |
| 26 | $D_{out}$ | Servo processor → µP | Serial interface Data output line |
| 27 | $C_{LPF}$ | - | Pin for connection of Low Pass Filter capacitor for *ADJUST LOGIC* |
| 28 | $I_{REF}$ | - | Reference current input |
| 29 | $V_{CC}$ | - | Positive supply connection pin ( 4V - 5.5V ) |
| 30 | $FS_{OUT}$ | Servo processor → Servo driver | Output of focus servo amplifier |
| 31 | FS - | - | Inverting input of focus servo amplifier |
| 32 | FEGain | - | Gain control pin of focus error amplifier |
| 33 | FE - | - | Inverting input of focus error amplifier |
| 34 | SGF | Servo processor → Focus error ampl. input | Signal generator output to focus servo, sends 1300Hz for adjust. procedure |
| 35 | $C_{FSR}$ | - | Charge capacitor for Focus Search triangle-generator |
| 36 | ALPC + | - | Non inverting input of Automatic Laser Power Control amplifier |
| 37 | ALPC - | - | Inverting input of Automatic Laser Power Control amplifier |
| 38 | $ALPC_{OUT}$ | Servo processor → Laser driver | Output of Automatic Laser Power Control amplifier |
| 39 | MRC | - | Connection pin for capacitor of Mirror detector |
| 40 | HF | Servo processor → Decoder | Output of HF amplifier |
| 41 | HFI | - | Inverting input of HF amplifier |
| 42 | ABC | - | Sum output of amplified A, B and C input ( central photo diode signal input ) to external ac-coupling capacitor |

## *SIGNAL PROCESSOR M65824FP*

| *Pin* | *Name* | *Direction* | *Description* |
|---|---|---|---|
| 1 | Anal. $V_{SS}$ | - | Analog system ground |
| 2 | ADJCLK | not connected | Clock output for servo adjustment; f=88.2kHz |
| 3 | LOCK | not connected | Lock monitor / low disc rotation output |
| 4 | CKSEL | - | System clock selection. Low=8.4672MHz, high=16.9344MHz |
| 5 | RESET | µP → Signal processor | System reset ( low level = active ) |
| 6 | C423 | Signal processor → µP | 4.2336MHz clock output |
| 7 | C846 | not connected | 8.4672MHz clock output |
| 8 | XI | X-Tal → Signal processor | Crystal oscillator input |
| 9 | DVSS | - | Digital system ground |
| 10 | XO | Signal processor → X-Tal | Crystal oscillator output |
| 11 | TEST | - | Normal / Test selection input. Testmode = high |
| 12 | SBCO | not connected | Subcode serial output |
| 13 | SCCK | - | Shift clock input for subcode data read |
| 14 | SYCLK | not connected | Frame lock status output. Lock = high |
| 15 | EFFK | not connected | EFM frame clock output. Duty = 50% |
| 16 | KILLB | not connected | Digital silence mute output. Digital zero = low |
| 17 | EST1 | not connected | Error monitor output 1 |
| 18 | EST2 | not connected | Error monitor output 2 |
| 19 | HF | Servo processor → Signal processor | HF signal input |
| 20 | TLC | - | Slice level control signal output |
| 21 | LPF | - | PLL loop filter |
| 22 | Dig.$V_{DD}$ | - | Digital interface power supply |
| 23 | DSPS | - | Digital system power supply |
| 24 | SBQS | not connected | Interrupt signal to read out subcode Q data. Read = low |
| 25 | CRCF | not connected | Subcode Q-channel Cyclic Redundance Check Flag output. CRC o.k.=high level |
| 26 | SCAND | not connected | Subcode sync signal detection. Sync = high |
| 27 | PWM | Signal processor → Motor driver | Disc motor driving ( Pulse Width Modulation ) output |
| 28 | DVDD2 | - | Digital interface power supply 2 |
| 29 | DVSS2 | - | Digital system ground2 |
| 30 | MCK | µP → Signal processor | µP interface shift Clock input |
| 31 | MSD | µP ↔ Signal processor | µP interface Serial Data I/O line |
| 32 | MLAB | µP → Signal processor | µP interface Latch clock input ( internal 22k pull up resistor ) |
| 33 | EXP1 | → Signal processor | Versatile input pin ( internal 4.7k pull up resistor ) |
| 34 | EXP2 | → Signal processor | Versatile input pin ( internal 4.7k pull up resistor ) |
| 35 | CGREF | → Signal processor | Charge-pump for LPF reference current input |
| 36 | AMPREF | not connected | Op-amp for LPF reference voltage setting |
| 37 | LOUT/DO | Signal processor → | Audio signal output (left channel) / Ext. DAC mode: Audio serial data output |
| 38 | LNEG | not connected | Charge pump output (left channel) / Ext. DAC mode: Wordclock output |
| 39 | ROUT/DSCK | Signal processor → | Audio signal output (right channel) / Ext. DAC mode: Data shift clock output |
| 40 | RNEG/LRCK | Signal processor → | Charge pump output (right channel) / Ext. DAC mode: L/R clock output |
| 41 | IREF | - | Current reference |
| 42 | Anal. $V_{DD}$ | - | Analog System power supply |

## NOTES

# SERVICE TESTPROGRAM


To enter Service Testprogramm hold PLAY & STOP buttons depressed while switching CD mode on.
* To leave Service Testprogram switch CD mode off.
* Door switch is ignored → CD door can be opened.
Display shows version number of the µ P - software.
88
Slide servo, Radial servo, Focus servo, Disc motor and Laser are switched off.
Mute is switched on via decoder IC.
DISPLAY TEST
CD SERVO TEST
CD PLAY TEST 1)
NEXT button pressed?
PLAY button pressed?
MODE button pressed?
STOP button pressed in any step returns to begin of Service Testprogram.
Display shows all segments and flags for checking open circuits. see figure 1
Display shows figure 2. All alternate pins (2, 4, ..) of the display are activated for checking shortcircuits.
STOP button pressed?
Display shows
1
SLIDE test
DISC MOTOR test
NEXT button pressed?
PREV. button pressed?
Slide moves outside as long as button is hold depressed.
Slide moves inside as long as button is hold depressed or until inner-switch is activated.
Disc motor turns clockwise as long as button is hold depressed. (accelerate )
FOCUS search
Display shows
-2
objective moves up&down disc motor for 160ms "on"
FOCUS found?
Display shows
2
disc motor turns.
To check Focus over the whole disc area Slide - and Discmotor can also be activated in FOCUS - test.
CD is in normal PLAY mode. In case of failures error codes acc. table 1 will be indicated on the display.
POWER switched off?
Exit Service Testprogram
automatic adjustment of TRACK BALANCE
automatic adjustment of FOCUS GAIN
automatic adjustment of TRACK GAIN
Display shows
3 → 3□
4 → 4□
5 → 5□
track servo switched on
3 while autom. track balance adjustment is active
3□ as soon as track balance adjustment finished.
□ (1 - 6) indicates the actual setting.
4 while autom. focus gain adjustment is active
4□ as soon as focus gain adjustment finished.
□ (1 - 6) indicates the actual setting.
5 while autom. track gain adjustment is active
5□ as soon as track gain adjustment finished.
□ (1 - 6) indicates the actual setting.
If the margin settings 0 or 7 are displayed the required setting is possibly out of the adjustment range.
→ check disc drive and/or electronic circuitry
RADIAL test
Display shows
6
→ Play mode
MUTE is switched off
NEXT button pressed?
PREV button pressed?
CUE - mode jumps in steps of 16 tracks forward
REVIEW - mode jumps in steps of 16 tracks backwards
Purpose of RADIAL test:
To check if the Audio signal is reproduced.
Subcode info is ignored during this test →
If the CD player functions well in this testmode, but not in the normal Play mode check quality of the eye-pattern signal.

1) The *CD PLAY TEST* is intended to be used for continuously playing a disc in order to detect intermittend or not reproducible failures. The error code indicates where the failure can be found.




fig. 1




fig. 2

servtest EVA, 021097

3-10

## CD ERROR codes

| *Error number* | *Error description* | *Error type* |
|---|---|---|
| E0 | **Focus Error**<br>Triggered when the focus is lost for more than 250ms during playing the CD. | W |
| E2 | **Slide-in error**<br>Generated when the inner-switch did not close within approx. 4s when the pick up is moved inside. Inner-switch or slide motor problems. | W |
| E3 | **Slide-out error**<br>Generated when the inner-switch did not open within approx. 250ms when the pick up is moved from the inner position outside. Inner-switch or slide motor problems. | W |
| E5 | **Jump error.**<br>Triggered when the servo processor counts too less tracks in a defined time during JUMPS. This can be caused by a disturbed HF-signal (the tracks cannot be recognized exactly), slide motor problems, track servo problems or scratched discs. | W |
| E6 | **Subcode Error**<br>No valid subcode for 300ms during *PLAY*. | W |
| E7 | **PLL lock error**<br>When the PLL did not lock after 10 retries then this warning message is generated and the servo is stopped and restarted (as if the user would have pressed *STOP* and then *PLAY* immediately) to recover. | W |
| F0 | **Focus Search Error**<br>Triggered when the focus could not be found within 3s when starting up the CD. | F |
| F2 | **Fatal Subcode Error**<br>No valid subcode for more than 4s during *PLAY*. | F |

table 1

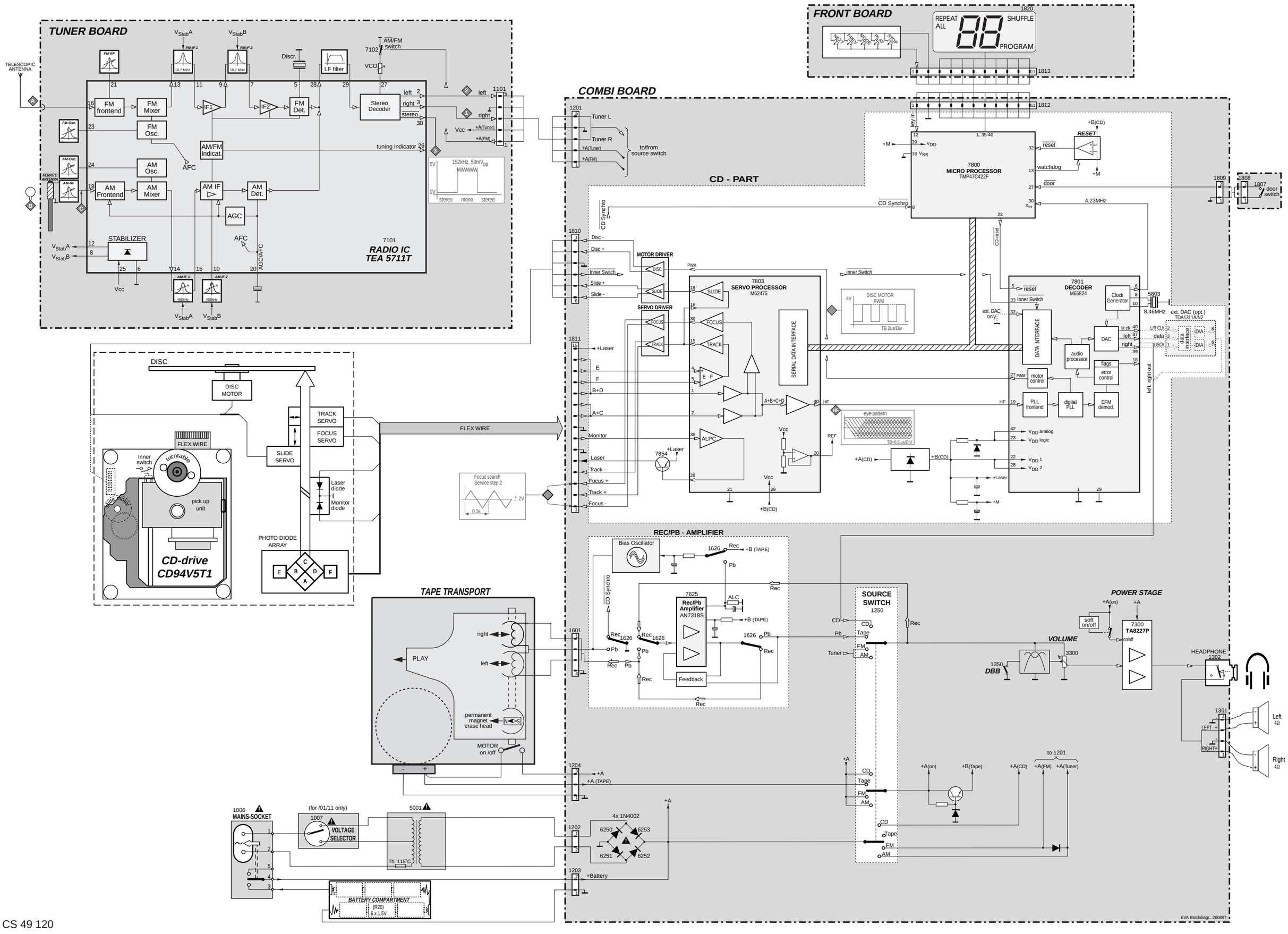
**Error type:** W = Warning → set continues operation, message remains on the display until next error occurs or any key is pressed.

F = Fatal Error → set stops operation, message remains on the display. (The set can only be operated again via a *reset*)

# BLOCK DIAGRAM

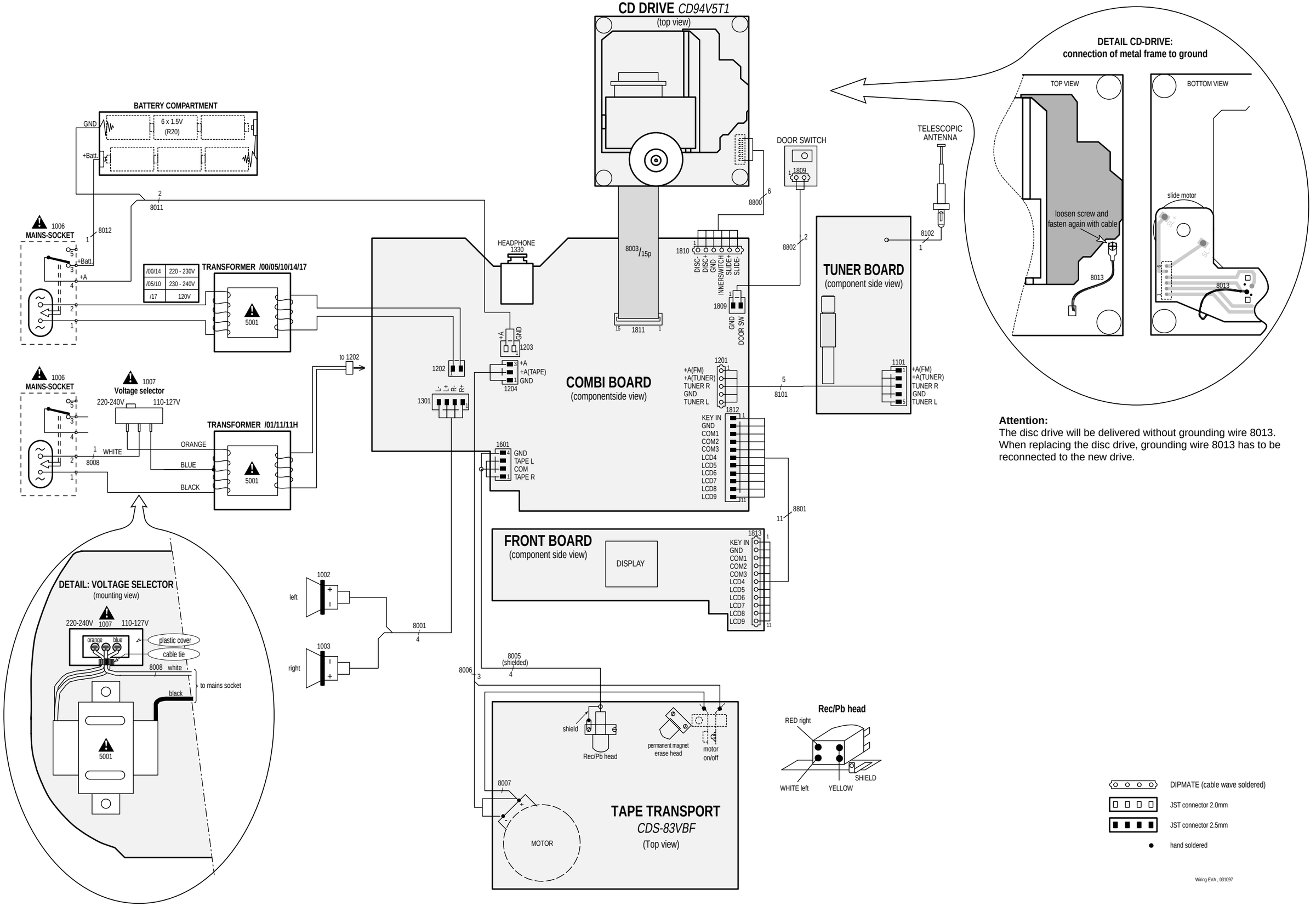


4-1



5-1

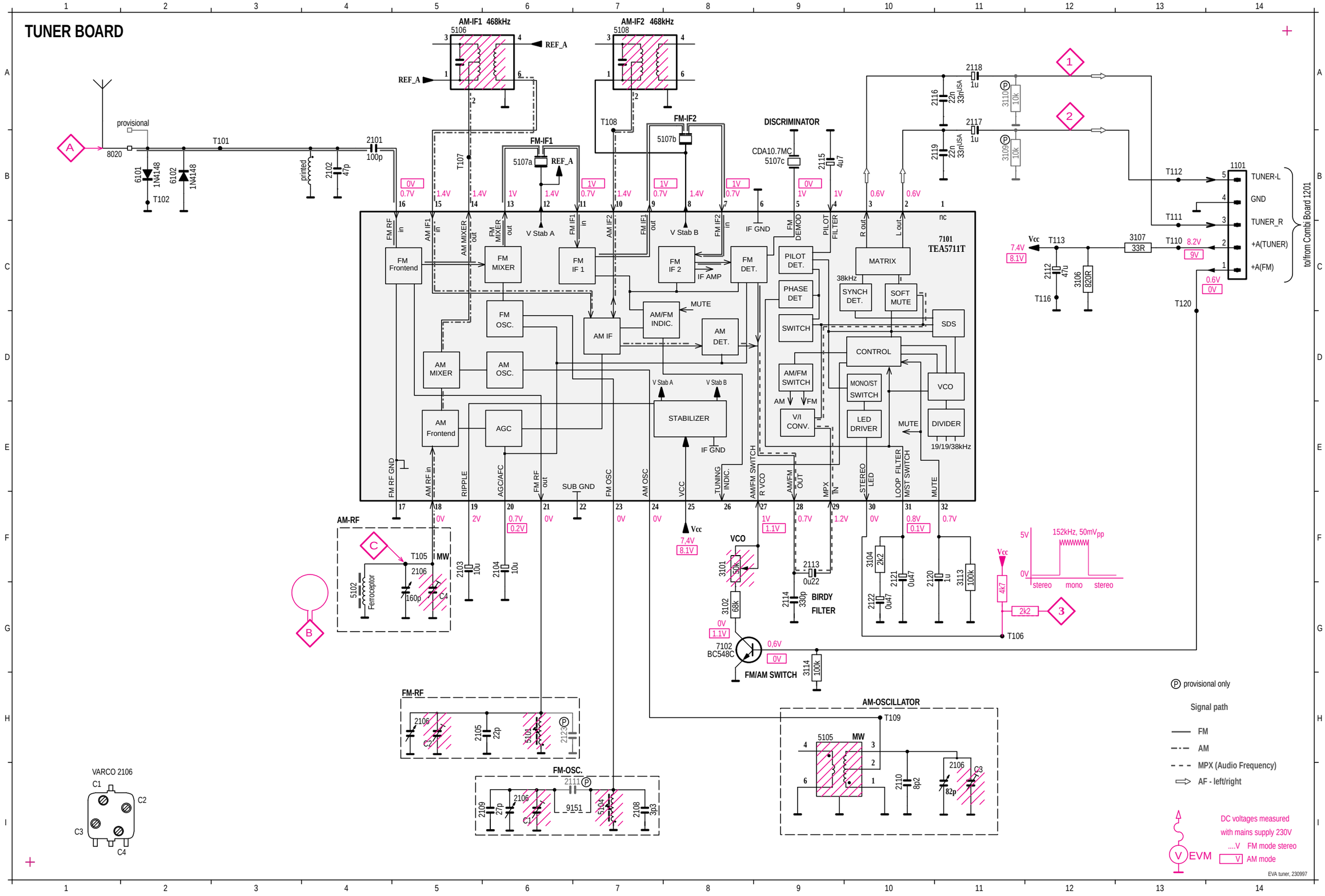
# WIRING DIAGRAM




**Attention:**
The disc drive will be delivered without grounding wire 8013. When replacing the disc drive, grounding wire 8013 has to be reconnected to the new drive.

6-1

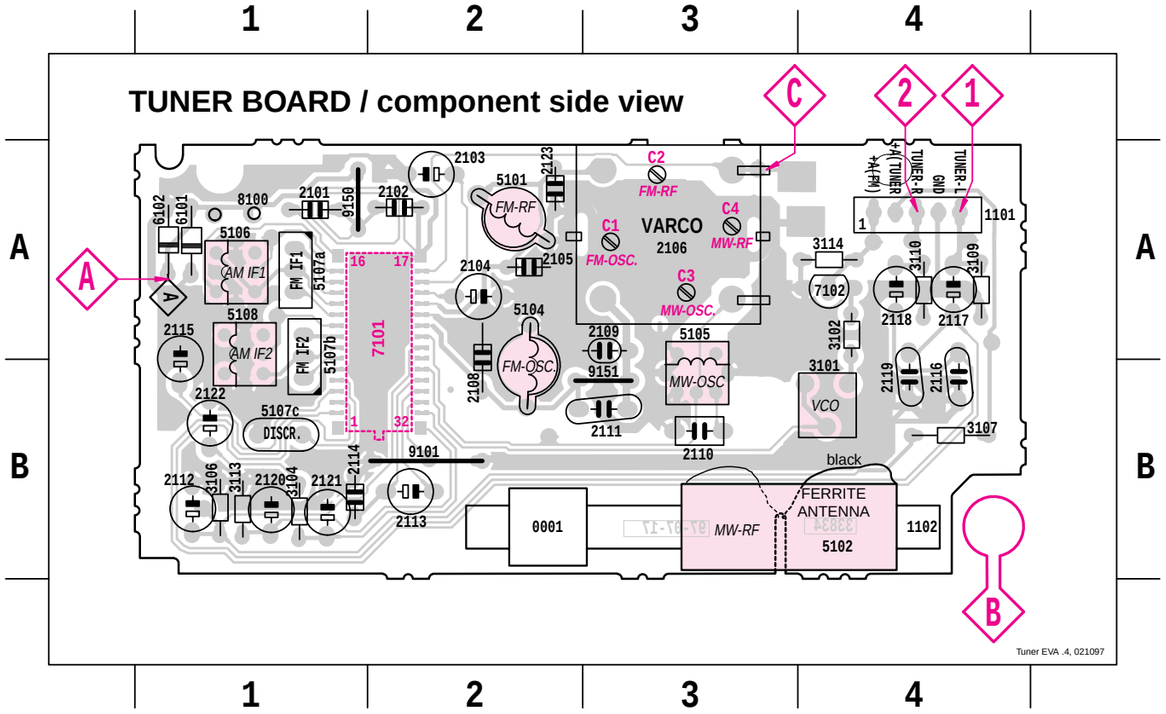
# TUNER BOARD

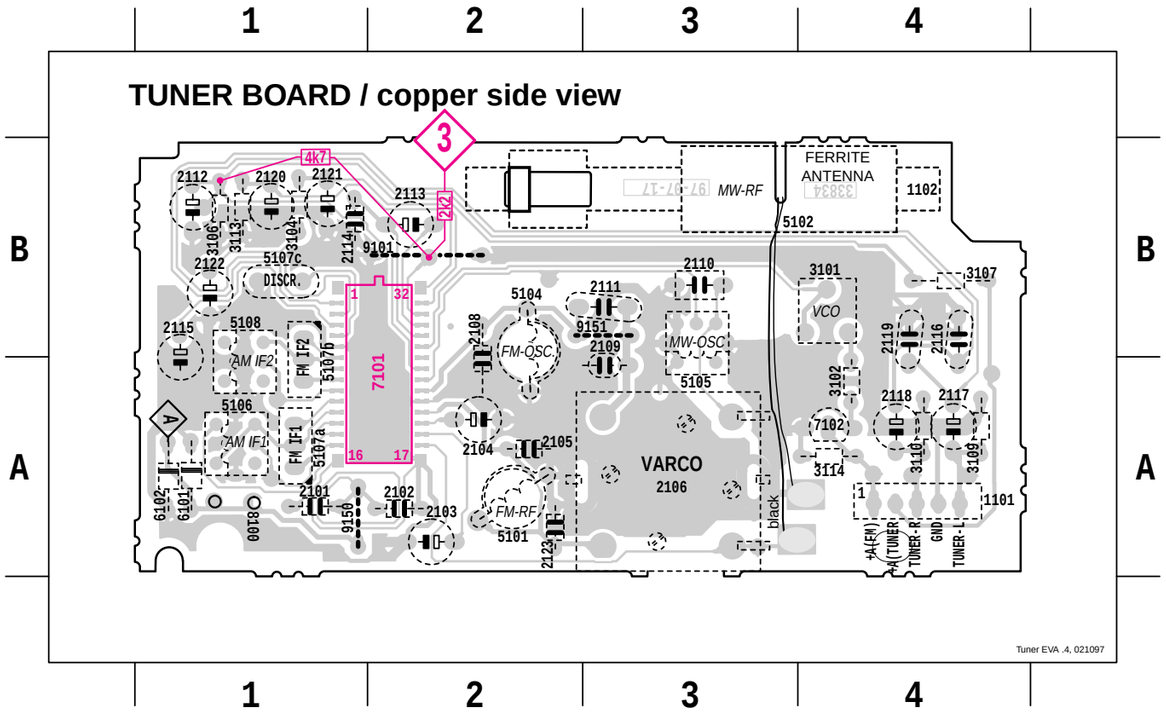



1101 B14
2101 B 4
2102 B 4
2103 F 5
2104 F 6
2105 H 5
2106 I 6
2106 I11
2106 F 5
2106 H 5
2108 I 7
2109 I 6
2110 I10
2111 I 7
2112 C12
2113 F 9
2114 G 9
2115 B 9
2116 A11
2117 A11
2118 A11
2119 B11
2120 F10
2121 F10
2122 G10
2123 H 6
3101 F 8
3102 G 8
3104 F10
3106 C12
3107 C13
3109 B11
3110 A11
3113 F11
3114 G 9
5101 H 6
5102 G 4
5104 I 7
5105 I 9
5106 A 5
5107a B 6
5107b B 8
5107c B 9
5108 A 7
6101 B 2
6102 B 2
7101 C11
7102 G 8
9151 I 6

6-2

```
0001 B 2    2104 A 2    2111 B 3    2117 A 4    2123 A 2    3109 A 4    5104 B 2    5108 A 1    9101 B 2
1101 A 4    2105 A 2    2112 B 1    2118 A 4    3101 B 4    3110 A 4    5105 B 3    6101 A 1    9150 A 1
1102 B 4    2106 A 3    2113 B 2    2119 B 4    3102 A 4    3113 B 1    5106 A 1    6102 A 1    9151 B 3
2101 A 1    2108 A 2    2114 B 1    2120 B 1    3104 B 1    3114 A 4    5107a A 1   7101 A 2
2102 A 2    2109 A 3    2115 A 1    2121 B 1    3106 B 1    5101 A 2    5107b A 1   7102 A 4
2103 A 2    2110 B 3    2116 B 4    2122 B 1    3107 B 4    5102 B 4    5107c B 1   8100 A 1
```




## TUNER ADJUSTMENT TABLE

| Waverange | Input Frequency | Input | Set tuned to | Adjust | Measure on | Scope / Counter |
|---|---|---|---|---|---|---|
| ***OSCILLATOR*** | | | | | | |
| **FM** [1] 87,5 - 108 MHz | 87,35 MHz<br>108,25 MHz | A<br>Δf = ±500kHz<br>$V_{RF}$ = 100µV | lower band end<br>upper band end | 5104<br>2106 C1 | 1 or 2 | $f_o$ |
| **MW** 525 - 1607 kHz (530 - 1710 kHz) [2] | 512 kHz (525 kHz)<br>1635 kHz (1720 kHz) | C<br>Δf = ±30kHz<br>$V_{RF}$ = 100µV | lower band end<br>upper band end | 5105<br>2106 C3 | 1 or 2 | $f_o$ |
| ***FM - RF*** | | | | | | |
| **FM** 87,5 - 108 MHz | 87,5 MHz<br>108 MHz | A<br>Δf = ±500kHz<br>$V_{RF}$ = 10µV | 87,5 MHz<br>108 MHz | 5101<br>2106 C2 | 1 or 2 | max. |
| ***VCO*** | | | | | | |
| **FM** | 98 MHz | A<br>continuous wave<br>$V_{RF}$ = 1 mV | 98 MHz | 3101 | 3<br>7101 pin 30<br>2k2<br>4k7<br>$V_{CC}$ | 152 ±1 kHz [3] |
| ***AM - IF*** | | | | | | |
| **MW** | 468 kHz<br>connect pin 24 of IC 7101 (AM Osc) with short wire to ground | C<br>Δf = ±15kHz<br>$V_{RF}$ = 10mV | IC 7101 10 — 100nF — 220R<br>IC 7101 14 — 100nF — 220R<br>see remark [4] | 5106<br>5108 | 1 or 2 | max.<br>$f_o$<br>symmetric |
| ***AM -RF*** | | | | | | |
| **MW** | 560 kHz<br>1500 kHz | B<br>Δf = ±30kHz<br>$V_{RF}$ as low as possible | 560 kHz<br>1500 kHz | 5102 (ferroceptor coil)<br>2106 C4 | 1 or 2 | max.<br>symmetric |

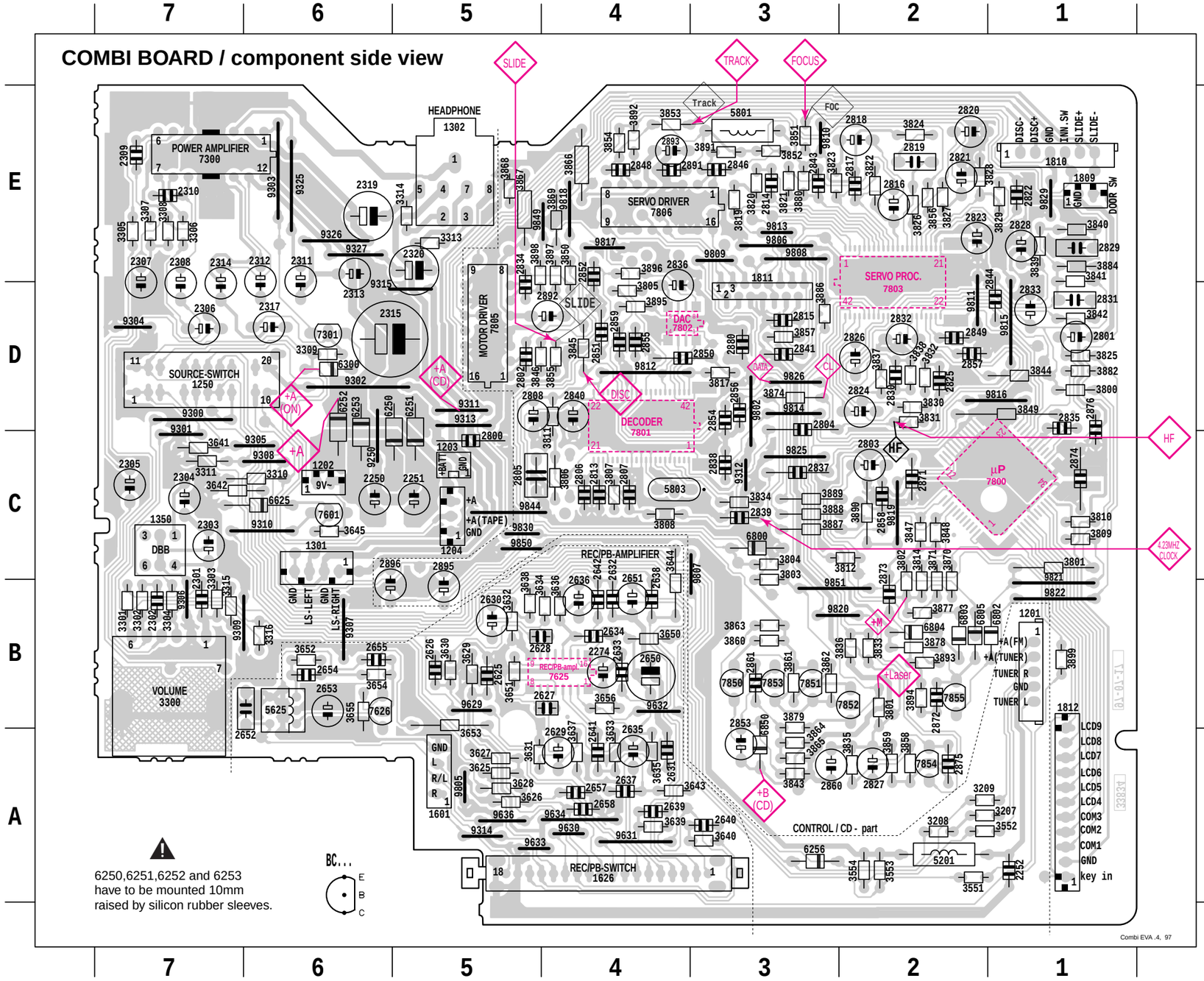
Tuner Adj. EVA, 021097

repeat

[1] Check if capacitor 2109 stands upright before starting adjustments.
[2] for USA /17
[3] If sensitivity of frequency counter is too low adjust to max. channel separation (input signal: stereo left 90% + 9%, adjust output on right channel to minimum).
[4] RC-network serves for damping the IF-filter while adjusting the other one.

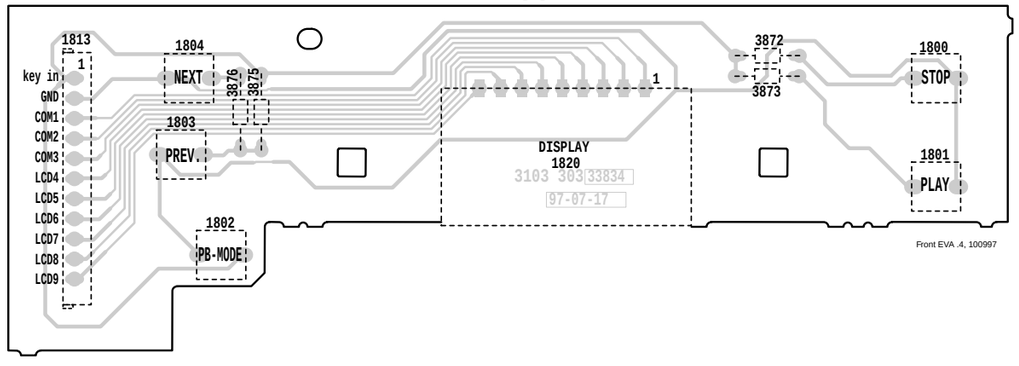
7-1

## COMBI BOARD / component side view

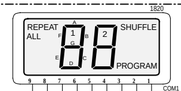



| | | | | |
|---|---|---|---|---|
| 1201 B 1 | 2815 D 3 | 3315 B 7 | 3843 A 3 | 7800 C 1 |
| 1202 C 6 | 2816 E 2 | 3316 B 6 | 3844 D 1 | 7801 D 4 |
| 1203 C 5 | 2817 E 2 | 3551 A 2 | 3845 D 4 | 7802 D 4 |
| 1204 C 5 | 2818 E 2 | 3552 A 2 | 3846 D 5 | 7803 D 2 |
| 1250 D 7 | 2819 E 2 | 3553 A 2 | 3847 C 2 | 7805 D 5 |
| 1301 C 6 | 2820 E 2 | 3554 A 2 | 3848 C 2 | 7806 E 4 |
| 1302 E 5 | 2821 E 2 | 3625 A 5 | 3849 D 1 | 7850 B 3 |
| 1350 C 7 | 2822 E 1 | 3626 A 5 | 3850 E 4 | 7851 B 3 |
| 1601 A 5 | 2823 E 2 | 3627 A 5 | 3851 E 3 | 7852 B 2 |
| 1626 A 4 | 2824 D 2 | 3628 A 5 | 3852 E 3 | 7853 B 3 |
| 1809 E 1 | 2825 D 2 | 3629 B 5 | 3853 E 4 | 7854 A 2 |
| 1810 E 1 | 2826 D 2 | 3630 B 5 | 3854 E 4 | 7855 B 2 |
| 1811 D 3 | 2827 A 2 | 3631 A 5 | 3855 D 4 | 9250 C 6 |
| 1812 A 1 | 2828 E 1 | 3632 B 5 | 3856 E 2 | 9300 D 7 |
| 2250 C 6 | 2829 E 1 | 3633 A 4 | 3857 D 3 | 9301 C 7 |
| 2251 C 5 | 2830 D 2 | 3634 B 4 | 3858 A 2 | 9302 D 6 |
| 2252 A 1 | 2831 D 1 | 3635 A 4 | 3859 A 2 | 9303 E 6 |
| 2274 B 4 | 2832 D 2 | 3636 B 4 | 3860 B 3 | 9304 D 7 |
| 2301 B 7 | 2833 D 1 | 3637 A 4 | 3861 B 3 | 9305 C 6 |
| 2302 B 7 | 2834 D 5 | 3638 B 5 | 3862 B 3 | 9306 B 7 |
| 2303 C 7 | 2835 D 1 | 3639 A 4 | 3863 B 3 | 9307 B 6 |
| 2304 C 7 | 2836 D 4 | 3640 A 3 | 3864 A 3 | 9308 C 6 |
| 2305 C 7 | 2837 C 3 | 3641 C 7 | 3865 A 3 | 9309 B 6 |
| 2306 D 7 | 2838 C 3 | 3642 C 7 | 3866 E 4 | 9310 C 6 |
| 2307 D 7 | 2839 C 3 | 3643 A 4 | 3867 E 5 | 9311 D 5 |
| 2308 D 7 | 2840 D 4 | 3644 B 4 | 3868 E 5 | 9312 C 3 |
| 2309 E 7 | 2841 D 3 | 3645 C 6 | 3869 E 4 | 9313 D 5 |
| 2310 E 7 | 2843 E 3 | 3650 B 4 | 3870 B 2 | 9314 A 5 |
| 2311 E 6 | 2844 D 1 | 3651 B 5 | 3871 B 2 | 9315 D 5 |
| 2312 E 6 | 2846 E 3 | 3652 B 6 | 3874 D 3 | 9325 E 6 |
| 2313 E 6 | 2848 E 4 | 3653 B 5 | 3877 B 2 | 9326 E 6 |
| 2314 D 7 | 2849 D 2 | 3654 B 6 | 3878 B 2 | 9327 E 6 |
| 2315 D 6 | 2850 D 4 | 3655 B 6 | 3879 B 3 | 9629 B 5 |
| 2317 D 6 | 2851 D 4 | 3656 B 4 | 3880 E 3 | 9630 A 4 |
| 2319 E 6 | 2852 E 4 | 3800 D 1 | 3881 C 1 | 9631 A 4 |
| 2320 E 5 | 2853 A 3 | 3801 B 2 | 3882 D 1 | 9632 B 4 |
| 2625 B 5 | 2854 D 3 | 3802 B 2 | 3884 E 1 | 9633 A 5 |
| 2626 B 5 | 2855 D 4 | 3803 B 3 | 3886 D 3 | 9634 A 4 |
| 2627 B 4 | 2856 D 3 | 3804 C 3 | 3887 C 3 | 9636 A 5 |
| 2628 B 5 | 2857 D 2 | 3805 D 4 | 3888 C 3 | 9802 D 3 |
| 2629 A 4 | 2858 C 2 | 3806 C 4 | 3889 C 3 | 9805 A 5 |
| 2630 B 5 | 2859 D 4 | 3807 C 4 | 3890 C 2 | 9806 E 3 |
| 2631 A 4 | 2860 A 3 | 3808 C 4 | 3891 E 3 | 9807 C 3 |
| 2632 B 4 | 2861 B 3 | 3809 C 1 | 3892 E 4 | 9808 E 3 |
| 2633 B 4 | 2871 C 2 | 3810 C 1 | 3893 B 2 | 9809 E 3 |
| 2634 B 4 | 2872 B 2 | 3811 D 4 | 3894 B 2 | 9810 E 3 |
| 2635 A 4 | 2873 B 2 | 3812 C 2 | 3895 D 4 | 9811 D 2 |
| 2636 B 4 | 2874 C 1 | 3814 B 2 | 3896 E 4 | 9812 D 4 |
| 2637 A 4 | 2875 A 2 | 3817 D 3 | 3897 E 4 | 9813 E 3 |
| 2638 B 4 | 2876 D 1 | 3819 E 3 | 3898 E 5 | 9814 D 3 |
| 2639 A 4 | 2880 D 3 | 3820 E 3 | 3899 B 1 | 9815 D 1 |
| 2640 A 3 | 2891 E 4 | 3821 E 3 | 5201 A 2 | 9816 D 1 |
| 2641 A 4 | 2892 D 4 | 3822 E 2 | 5625 B 6 | 9817 E 4 |
| 2642 B 4 | 2893 E 4 | 3823 E 3 | 5801 E 3 | 9818 E 4 |
| 2650 B 4 | 2895 B 5 | 3824 E 2 | 5803 C 4 | 9819 C 2 |
| 2651 B 4 | 2896 B 6 | 3825 D 1 | 6250 C 5 | 9820 B 3 |
| 2652 B 6 | 3207 A 2 | 3826 E 2 | 6251 C 5 | 9821 B 1 |
| 2653 B 6 | 3208 A 2 | 3827 E 2 | 6252 D 6 | 9822 B 1 |
| 2654 B 6 | 3209 A 2 | 3828 E 2 | 6253 C 6 | 9825 C 3 |
| 2655 B 6 | 3300 B 7 | 3829 E 1 | 6256 A 3 | 9826 D 3 |
| 2657 A 4 | 3301 B 7 | 3830 D 2 | 6300 D 6 | 9829 E 1 |
| 2658 A 4 | 3302 B 7 | 3831 D 2 | 6625 C 6 | 9830 C 5 |
| 2800 C 5 | 3303 B 7 | 3832 D 2 | 6800 C 3 | 9844 C 5 |
| 2801 D 1 | 3304 B 7 | 3833 B 2 | 6802 B 1 | 9849 E 4 |
| 2802 D 5 | 3305 E 7 | 3834 C 3 | 6803 B 2 | 9850 C 5 |
| 2803 C 2 | 3306 E 7 | 3835 A 2 | 6804 B 2 | 9851 B 3 |
| 2804 D 3 | 3307 E 7 | 3836 B 2 | 6805 B 2 | |
| 2805 C 5 | 3308 E 7 | 3837 D 2 | 6850 A 3 | |
| 2806 C 4 | 3309 D 6 | 3838 D 2 | 7300 E 7 | |
| 2807 C 4 | 3310 C 6 | 3839 E 1 | 7301 D 6 | |
| 2808 D 5 | 3311 C 7 | 3840 E 1 | 7601 C 6 | |
| 2813 C 4 | 3313 E 5 | 3841 E 1 | 7625 B 4 | |
| 2814 E 3 | 3314 E 5 | 3842 D 1 | 7626 B 6 | |

## FRONT BOARD / copper side view

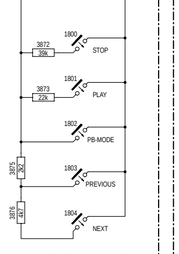


# FRONT BOARD

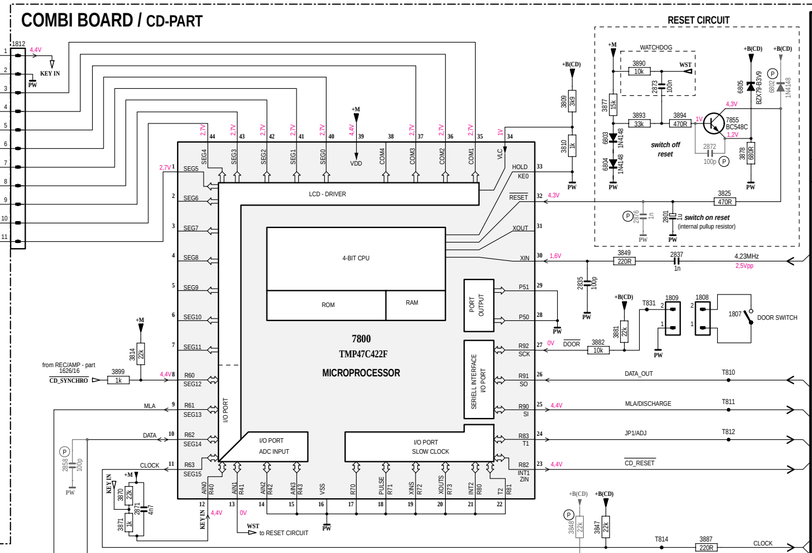



DISPLAY CONNECTION TABLE

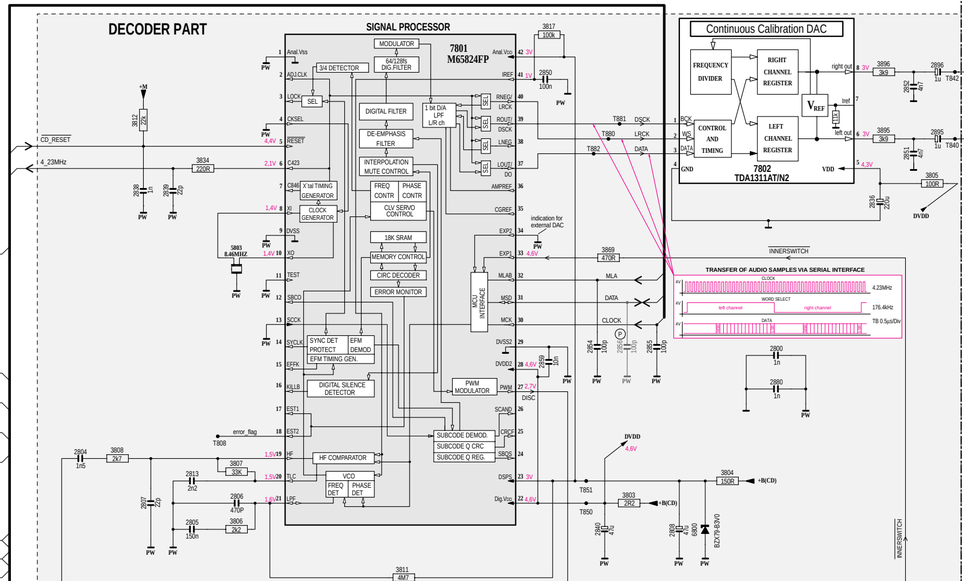
| pin | COM1 | COM2 | COM3 |
|---|---|---|---|
| 1 | COM1 | | |
| 2 | | COM2 | |
| 3 | | | COM3 |
| 4 | 1E | 1F | REPEAT |
| 5 | 1D | 1G | ALL |
| 6 | 1C | 1B | 1A |
| 7 | 2E | 2F | PROGRAM |
| 8 | 2D | 2G | SHUFFLE |
| 9 | 2C | 2B | 2A |



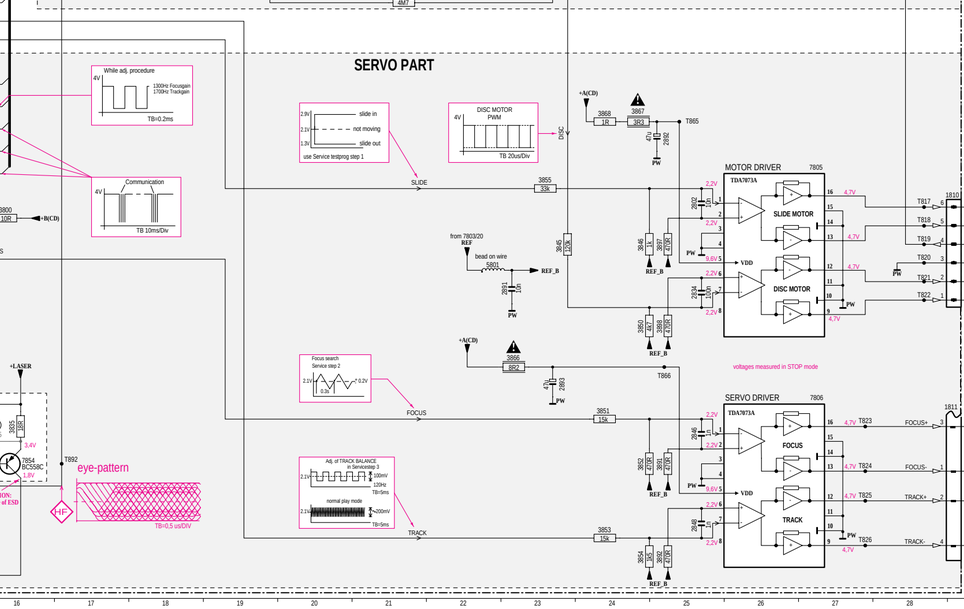

# COMBI BOARD / CD-PART

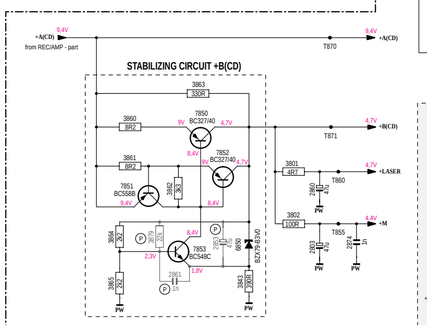


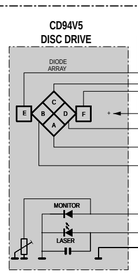

# DECODER PART

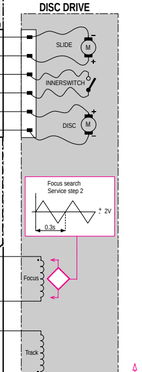



# SERVO PART




P provisional

...V DC voltages measured in CD play mode (mains supply 230V)

EVM

EVM Contr. 222287

| | | | |
|---|---|---|---|
| 1800 E 4 | 3894 B14 | 2 | |
| 1801 E 4 | 3895 C28 | 3 | |
| 1802 F 4 | 3896 B28 | 4 | |
| 1803 G 4 | 3897 L25 | 5 | |
| 1804 G 4 | 3898 M25 | 6 | |
| 1807 E15 | 3899 F 7 | 7 | |
| 1808 E14 | 5801 L22 | 8 | |
| 1809 E14 | 5803 D19 | 9 | |
| 1810 A28 | 6800 H25 | 10 | |
| 1811 M 5 | 6802 B15 | 11 | |
| 1812 A 5 | 6803 C13 | 12 | |
| 1813 A 5 | 6804 C13 | 13 | |
| 1820 B 2 | 6805 D15 | 14 | |
| 2800 E26 | 6850 K 3 | 15 | |
| 2801 D14 | 7800 E10 | 16 | |
| 2802 K25 | 7801 A20 | 17 | |
| 2803 K 4 | 7802 C27 | 18 | |
| 2804 G17 | 7803 I10 | 19 | |
| 2805 H19 | 7805 K27 | 20 | |
| 2806 H19 | 7806 N27 | 21 | |
| 2807 H18 | 7850 I 3 | 22 | |
| 2808 H25 | 7851 I 2 | 23 | |
| 2813 G18 | 7852 J 3 | 24 | |
| 2814 N 9 | 7853 K 3 | 25 | |
| 2815 M 6 | 7854 O16 | 26 | |
| 2816 M 8 | 7855 B15 | 27 | |
| 2817 M 8 | | 28 | |
| 2818 M 9 | | 29 | |
| 2819 L 9 | | 30 | |
| 2820 K 8 | | 31 | |
| 2821 K 8 | | | |
| 2822 J 9 | | | |
| 2823 J 9 | | | |
| 2824 P13 | | | |
| 2825 P14 | | | |
| 2826 O13 | | | |
| 2827 N25 | | | |
| 2828 N14 | | | |
| 2829 M14 | | | |
| 2830 M13 | | | |
| 2831 L14 | | | |
| 2832 K13 | | | |
| 2833 L15 | | | |
| 2834 L25 | | | |
| 2835 E13 | | | |
| 2836 D28 | | | |
| 2837 D14 | | | |
| 2838 C18 | | | |
| 2839 C18 | | | |
| 2840 H24 | | | |
| 2841 O 8 | | | |
| 2843 N 8 | | | |
| 2844 K14 | | | |
| 2846 N25 | | | |
| 2848 P25 | | | |
| 2849 K14 | | | |
| 2850 B23 | | | |
| 2851 C28 | | | |
| 2852 B28 | | | |
| 2853 K 3 | | | |
| 2854 E24 | | | |
| 2855 E25 | | | |
| 2856 E24 | | | |
| 2857 K15 | | | |
| 2858 G 6 | | | |
| 2859 F23 | | | |
| 2860 J 4 | | | |
| 2861 L 2 | | | |
| 2871 H 7 | | | |
| 2872 C15 | | | |
| 2873 B14 | | | |
| 2874 K 5 | | | |
| 2875 N16 | | | |
| 2876 D14 | | | |
| 2880 F26 | | | |
| 2891 L23 | | | |
| 2892 J25 | | | |
| 2893 N23 | | | |
| 2895 C28 | | | |
| 2896 B28 | | | |
| 3800 K16 | | | |
| 3801 J 4 | | | |
| 3802 J 4 | | | |
| 3803 H24 | | | |
| 3804 N 6 | | | |
| 3805 C28 | | | |
| 3806 H19 | | | |
| 3807 G19 | | | |
| 3808 G17 | | | |
| 3809 B13 | | | |
| 3810 C13 | | | |
| 3811 G 1 | | | |
| 3812 B18 | | | |
| 3814 E 7 | | | |
| 3817 A23 | | | |
| 3819 N 9 | | | |
| 3820 N 9 | | | |
| 3821 M 9 | | | |
| 3822 M 9 | | | |
| 3823 M 9 | | | |
| 3824 L 8 | | | |
| 3825 C15 | | | |
| 3826 L 9 | | | |
| 3827 K 9 | | | |
| 3828 K 9 | | | |
| 3829 K 9 | | | |
| 3830 P13 | | | |
| 3831 O14 | | | |
| 3832 P14 | | | |
| 3833 N14 | | | |
| 3834 C19 | | | |
| 3836 N16 | | | |
| 3837 M13 | | | |
| 3838 M13 | | | |
| 3839 M13 | | | |
| 3840 M14 | | | |
| 3841 L13 | | | |
| 3842 L14 | | | |
| 3843 L 1 | | | |
| 3844 K13 | | | |
| 3845 L23 | | | |
| 3846 L24 | | | |
| 3847 H13 | | | |
| 3848 H13 | | | |
| 3849 D13 | | | |
| 3850 M24 | | | |
| 3851 N24 | | | |
| 3852 O24 | | | |
| 3853 P24 | | | |
| 3854 P24 | | | |
| 3855 K23 | | | |
| 3856 K 9 | | | |
| 3857 L 6 | | | |
| 3858 O15 | | | |
| 3859 O15 | | | |
| 3860 J 2 | | | |
| 3861 J 2 | | | |
| 3862 J 2 | | | |
| 3863 I 3 | | | |
| 3864 K 2 | | | |
| 3865 L 2 | | | |
| 3866 N23 | | | |
| 3867 J24 | | | |
| 3868 J24 | | | |
| 3869 D24 | | | |
| 3870 G 7 | | | |
| 3871 H 7 | | | |
| 3872 E 3 | | | |
| 3873 F 3 | | | |
| 3874 J15 | | | |
| 3875 G 3 | | | |
| 3876 G 3 | | | |
| 3877 B13 | | | |
| 3878 C15 | | | |
| 3879 K 2 | | | |
| 3880 M 9 | | | |
| 3881 E13 | | | |
| 3882 E13 | | | |
| 3884 M14 | | | |
| 3886 N 6 | | | |
| 3887 H15 | | | |
| 3888 H15 | | | |
| 3889 I15 | | | |
| 3890 B14 | | | |
| 3891 O25 | | | |
| 3892 P25 | | | |
| 3893 B14 | | | |

7-3
7-3

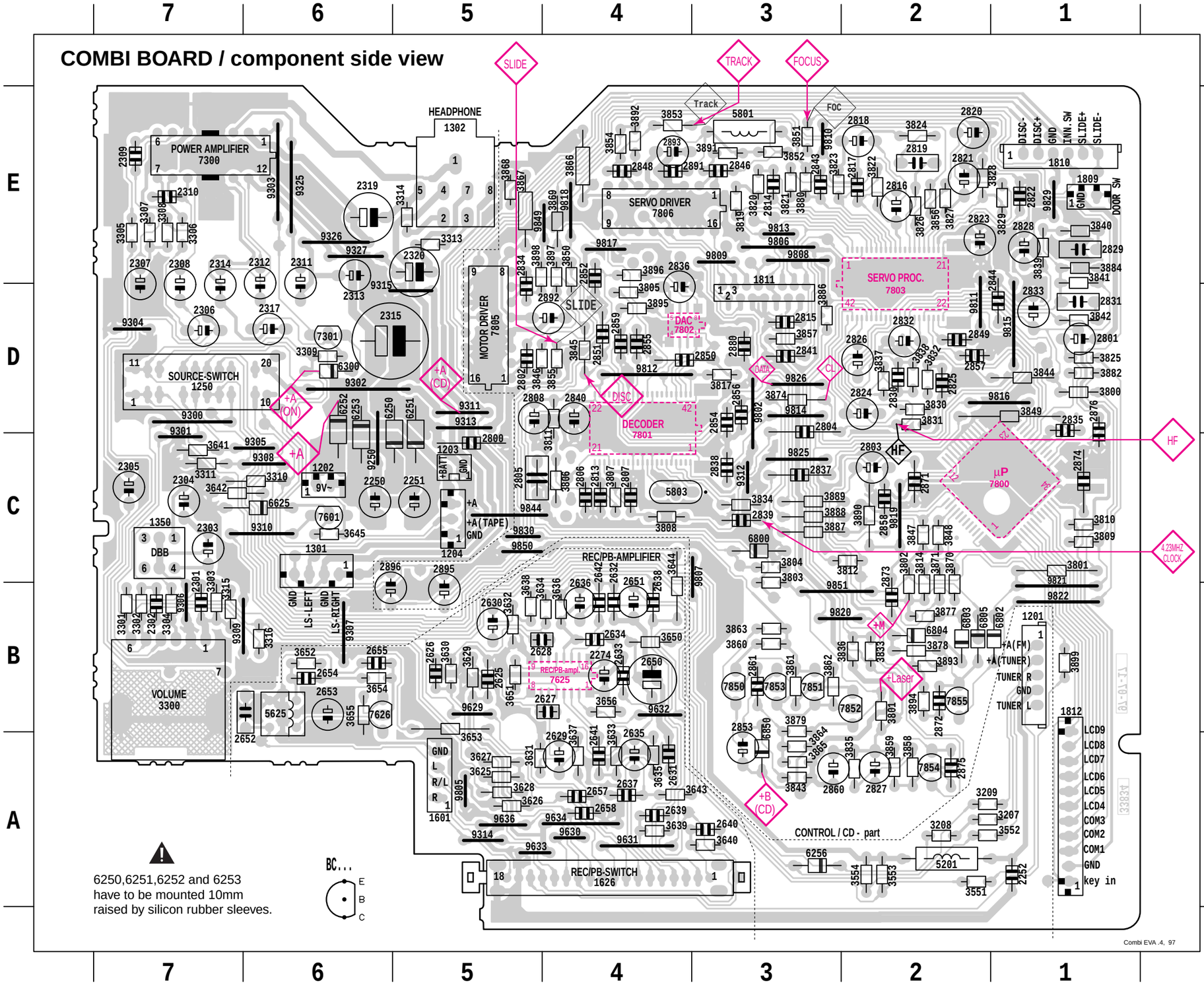
# COMBI BOARD /
## RECORDER/AMPLIFIER PART

REC/PB-AMP RIGHT
REC/PB-AMP LEFT
BIAS OSCILLATOR
SOURCE SWITCH
VOLUME POTMETER
DBB
ANTI PLOP
MUTE
VCC
RIPPLE
HEADPHONE
TAPE TRANSPORT
Permanent Magnet Erase Head
MAINS-SOCKET
TRANSFORMER /00/04/05/06/10/13/14/17
TRANSFORMER /01/11/11H
VOLTAGE SELECTOR
BATTERIES
6xR20
Tape transport
Motor Switch
TAPE MOTOR
1626 Rec/Pb-Switch
SIGNAL PATH
DC voltages measured with mains supply 230V
Radio FM mode
tape mode
CD mode
EVM
EVA_RecAmp_021097

**Adjustment of tape speed:** *(use Universal Test Cassette SBC420, 3150Hz part)*
Measure on headphone socket and adjust trimpot. on motor to 3150Hz ±1%.

7-4

## COMBI BOARD / component side view



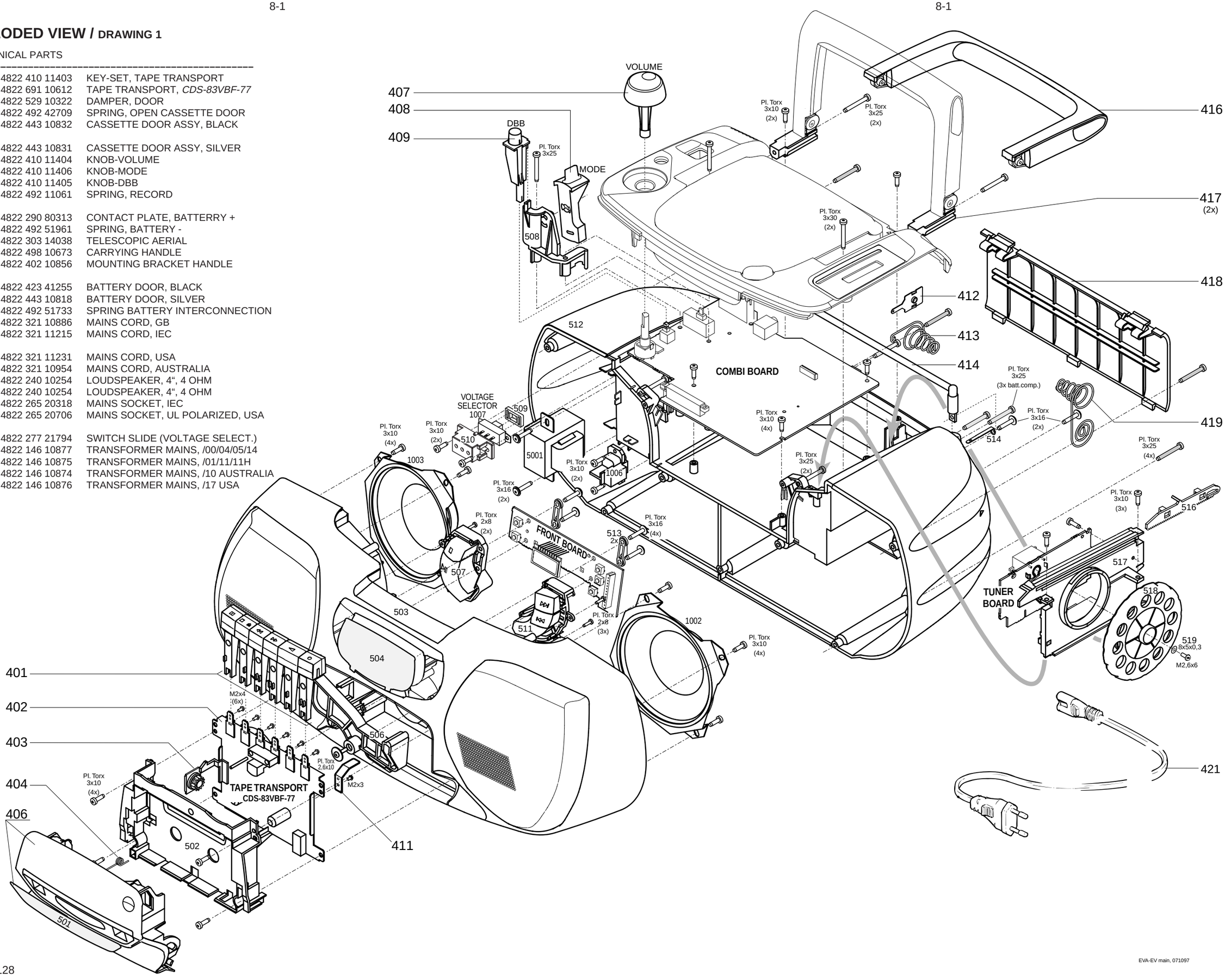

| | | | | |
|---|---|---|---|---|
| 1201 B 1 | 2815 D 3 | 3315 B 7 | 3843 A 3 | 7800 C 1 |
| 1202 C 6 | 2816 E 2 | 3316 B 6 | 3844 D 1 | 7801 D 4 |
| 1203 C 5 | 2817 E 2 | 3551 A 2 | 3845 D 4 | 7802 D 4 |
| 1204 C 5 | 2818 E 2 | 3552 A 2 | 3846 D 5 | 7803 D 2 |
| 1250 D 7 | 2819 E 2 | 3553 A 2 | 3847 C 2 | 7805 D 5 |
| 1301 C 6 | 2820 E 2 | 3554 A 2 | 3848 C 2 | 7806 E 4 |
| 1302 E 5 | 2821 E 2 | 3625 A 5 | 3849 D 1 | 7850 B 3 |
| 1350 C 7 | 2822 E 1 | 3626 A 5 | 3850 E 4 | 7851 B 3 |
| 1601 A 5 | 2823 E 2 | 3627 A 5 | 3851 E 3 | 7852 B 2 |
| 1626 A 4 | 2824 D 2 | 3628 A 5 | 3852 E 3 | 7853 B 3 |
| 1809 E 1 | 2825 D 2 | 3629 B 5 | 3853 E 4 | 7854 A 2 |
| 1810 E 1 | 2826 D 2 | 3630 B 5 | 3854 E 4 | 7855 B 2 |
| 1811 D 3 | 2827 A 2 | 3631 A 5 | 3855 D 4 | 9250 C 6 |
| 1812 A 1 | 2828 E 1 | 3632 B 5 | 3856 E 2 | 9300 D 7 |
| 2250 C 6 | 2829 E 1 | 3633 A 4 | 3857 D 3 | 9301 C 7 |
| 2251 C 5 | 2830 D 2 | 3634 B 4 | 3858 A 2 | 9302 D 6 |
| 2252 A 1 | 2831 D 1 | 3635 A 4 | 3859 A 2 | 9303 E 6 |
| 2274 B 4 | 2832 D 2 | 3636 B 4 | 3860 B 3 | 9304 D 7 |
| 2301 B 7 | 2833 D 1 | 3637 A 4 | 3861 B 3 | 9305 C 6 |
| 2302 B 7 | 2834 D 5 | 3638 B 5 | 3862 B 3 | 9306 B 7 |
| 2303 C 7 | 2835 D 1 | 3639 A 4 | 3863 B 3 | 9307 B 6 |
| 2304 C 7 | 2836 D 4 | 3640 A 3 | 3864 A 3 | 9308 C 6 |
| 2305 C 7 | 2837 C 3 | 3641 C 7 | 3865 A 3 | 9309 B 6 |
| 2306 D 7 | 2838 C 3 | 3642 C 7 | 3866 E 4 | 9310 C 6 |
| 2307 D 7 | 2839 C 3 | 3643 A 4 | 3867 E 5 | 9311 D 5 |
| 2308 D 7 | 2840 D 4 | 3644 B 4 | 3868 E 5 | 9312 C 3 |
| 2309 E 7 | 2841 D 3 | 3645 C 6 | 3869 E 4 | 9313 D 5 |
| 2310 E 7 | 2843 E 3 | 3650 B 4 | 3870 B 2 | 9314 A 5 |
| 2311 E 6 | 2844 D 1 | 3651 B 5 | 3871 B 2 | 9315 D 5 |
| 2312 E 6 | 2846 E 3 | 3652 B 6 | 3874 D 3 | 9325 E 6 |
| 2313 E 6 | 2848 E 4 | 3653 B 5 | 3877 B 2 | 9326 E 6 |
| 2314 D 7 | 2849 D 2 | 3654 B 6 | 3878 B 2 | 9327 E 6 |
| 2315 D 6 | 2850 D 4 | 3655 B 6 | 3879 B 3 | 9629 B 5 |
| 2317 D 6 | 2851 D 4 | 3656 B 4 | 3880 E 3 | 9630 A 4 |
| 2319 E 6 | 2852 E 4 | 3800 D 1 | 3881 C 1 | 9631 A 4 |
| 2320 E 5 | 2853 A 3 | 3801 B 2 | 3882 D 1 | 9632 B 4 |
| 2625 B 5 | 2854 D 3 | 3802 B 2 | 3884 E 1 | 9633 A 5 |
| 2626 B 5 | 2855 D 4 | 3803 B 3 | 3886 D 3 | 9634 A 4 |
| 2627 B 4 | 2856 D 3 | 3804 C 3 | 3887 C 3 | 9636 A 5 |
| 2628 B 5 | 2857 D 2 | 3805 D 4 | 3888 C 3 | 9802 D 3 |
| 2629 A 4 | 2858 C 2 | 3806 C 4 | 3889 C 3 | 9805 A 5 |
| 2630 B 5 | 2859 D 4 | 3807 C 4 | 3890 C 2 | 9806 E 3 |
| 2631 A 4 | 2860 A 3 | 3808 C 4 | 3891 E 3 | 9807 C 3 |
| 2632 B 4 | 2861 B 3 | 3809 C 1 | 3892 E 4 | 9808 E 3 |
| 2633 B 4 | 2871 C 2 | 3810 C 1 | 3893 B 2 | 9809 E 3 |
| 2634 B 4 | 2872 B 2 | 3811 D 4 | 3894 B 2 | 9810 E 3 |
| 2635 A 4 | 2873 B 2 | 3812 C 2 | 3895 D 4 | 9811 D 2 |
| 2636 B 4 | 2874 C 1 | 3814 B 2 | 3896 E 4 | 9812 D 4 |
| 2637 A 4 | 2875 A 2 | 3817 D 3 | 3897 E 4 | 9813 E 3 |
| 2638 B 4 | 2876 D 1 | 3819 E 3 | 3898 E 5 | 9814 D 3 |
| 2639 A 4 | 2880 D 3 | 3820 E 3 | 3899 B 1 | 9815 D 1 |
| 2640 A 3 | 2891 E 4 | 3821 E 3 | 5201 A 2 | 9816 D 1 |
| 2641 A 4 | 2892 D 4 | 3822 E 2 | 5625 B 6 | 9817 E 4 |
| 2642 B 4 | 2893 E 4 | 3823 E 3 | 5801 E 3 | 9818 E 4 |
| 2650 B 4 | 2895 B 5 | 3824 E 2 | 5803 C 4 | 9819 C 2 |
| 2651 B 4 | 2896 B 6 | 3825 D 1 | 6250 C 5 | 9820 B 3 |
| 2652 B 6 | 3207 A 2 | 3826 E 2 | 6251 C 5 | 9821 B 1 |
| 2653 B 6 | 3208 A 2 | 3827 E 2 | 6252 D 6 | 9822 B 1 |
| 2654 B 6 | 3209 A 2 | 3828 E 2 | 6253 C 6 | 9825 C 3 |
| 2655 B 6 | 3300 B 7 | 3829 E 1 | 6256 A 3 | 9826 D 3 |
| 2657 A 4 | 3301 B 7 | 3830 D 2 | 6300 D 6 | 9829 E 1 |
| 2658 A 4 | 3302 B 7 | 3831 D 2 | 6625 C 6 | 9830 C 5 |
| 2800 C 5 | 3303 B 7 | 3832 D 2 | 6800 C 3 | 9844 C 5 |
| 2801 D 1 | 3304 B 7 | 3833 B 2 | 6802 B 1 | 9849 E 4 |
| 2802 D 5 | 3305 E 7 | 3834 C 3 | 6803 B 2 | 9850 C 5 |
| 2803 C 2 | 3306 E 7 | 3835 A 2 | 6804 B 2 | 9851 B 3 |
| 2804 D 3 | 3307 E 7 | 3836 B 2 | 6805 B 2 | |
| 2805 C 5 | 3308 E 7 | 3837 D 2 | 6850 A 3 | |
| 2806 C 4 | 3309 D 6 | 3838 D 2 | 7300 E 7 | |
| 2807 C 4 | 3310 C 6 | 3839 E 1 | 7301 D 6 | |
| 2808 D 5 | 3311 C 7 | 3840 E 1 | 7601 C 6 | |
| 2813 C 4 | 3313 E 5 | 3841 E 1 | 7625 B 4 | |
| 2814 E 3 | 3314 E 5 | 3842 D 1 | 7626 B 6 | |

# EXPLODED VIEW / DRAWING 1

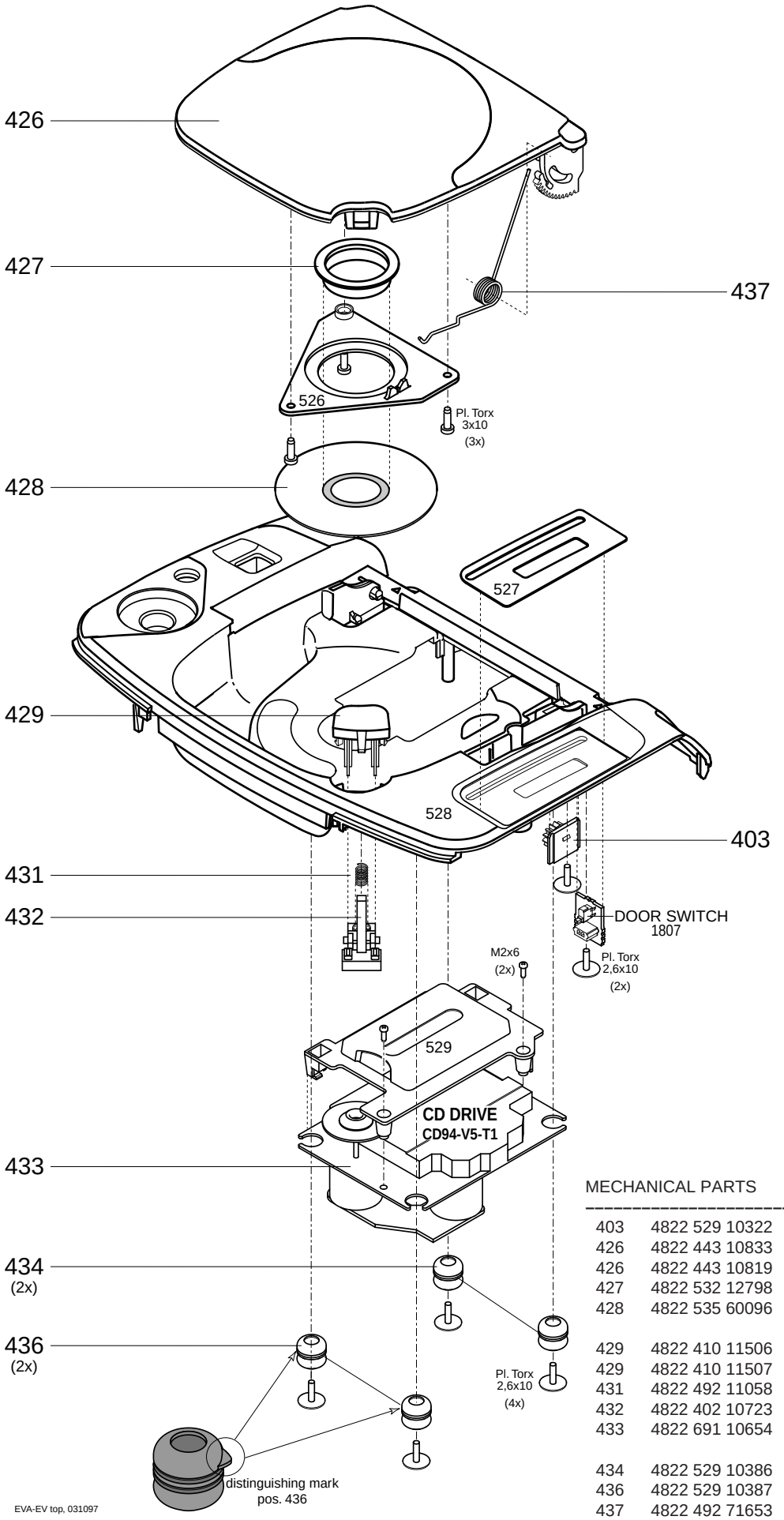
MECHANICAL PARTS

| | | |
|---|---|---|
| 401 | 4822 410 11403 | KEY-SET, TAPE TRANSPORT |
| 402 | 4822 691 10612 | TAPE TRANSPORT, *CDS-83VBF-77* |
| 403 | 4822 529 10322 | DAMPER, DOOR |
| 404 | 4822 492 42709 | SPRING, OPEN CASSETTE DOOR |
| 406 | 4822 443 10832 | CASSETTE DOOR ASSY, BLACK |
| 406 | 4822 443 10831 | CASSETTE DOOR ASSY, SILVER |
| 407 | 4822 410 11404 | KNOB-VOLUME |
| 408 | 4822 410 11406 | KNOB-MODE |
| 409 | 4822 410 11405 | KNOB-DBB |
| 411 | 4822 492 11061 | SPRING, RECORD |
| 412 | 4822 290 80313 | CONTACT PLATE, BATTERRY + |
| 413 | 4822 492 51961 | SPRING, BATTERY - |
| 414 | 4822 303 14038 | TELESCOPIC AERIAL |
| 416 | 4822 498 10673 | CARRYING HANDLE |
| 417 | 4822 402 10856 | MOUNTING BRACKET HANDLE |
| 418 | 4822 423 41255 | BATTERY DOOR, BLACK |
| 418 | 4822 443 10818 | BATTERY DOOR, SILVER |
| 419 | 4822 492 51733 | SPRING BATTERY INTERCONNECTION |
| 421 ⚠ | 4822 321 10886 | MAINS CORD, GB |
| 421 ⚠ | 4822 321 11215 | MAINS CORD, IEC |
| 421 ⚠ | 4822 321 11231 | MAINS CORD, USA |
| 421 ⚠ | 4822 321 10954 | MAINS CORD, AUSTRALIA |
| 1002 | 4822 240 10254 | LOUDSPEAKER, 4“, 4 OHM |
| 1003 | 4822 240 10254 | LOUDSPEAKER, 4“, 4 OHM |
| 1006 ⚠ | 4822 265 20318 | MAINS SOCKET, IEC |
| 1006 ⚠ | 4822 265 20706 | MAINS SOCKET, UL POLARIZED, USA |
| 1007 ⚠ | 4822 277 21794 | SWITCH SLIDE (VOLTAGE SELECT.) |
| 5001 ⚠ | 4822 146 10877 | TRANSFORMER MAINS, /00/04/05/14 |
| 5001 ⚠ | 4822 146 10875 | TRANSFORMER MAINS, /01/11/11H |
| 5001 ⚠ | 4822 146 10874 | TRANSFORMER MAINS, /10 AUSTRALIA |
| 5001 ⚠ | 4822 146 10876 | TRANSFORMER MAINS, /17 USA |

8-1



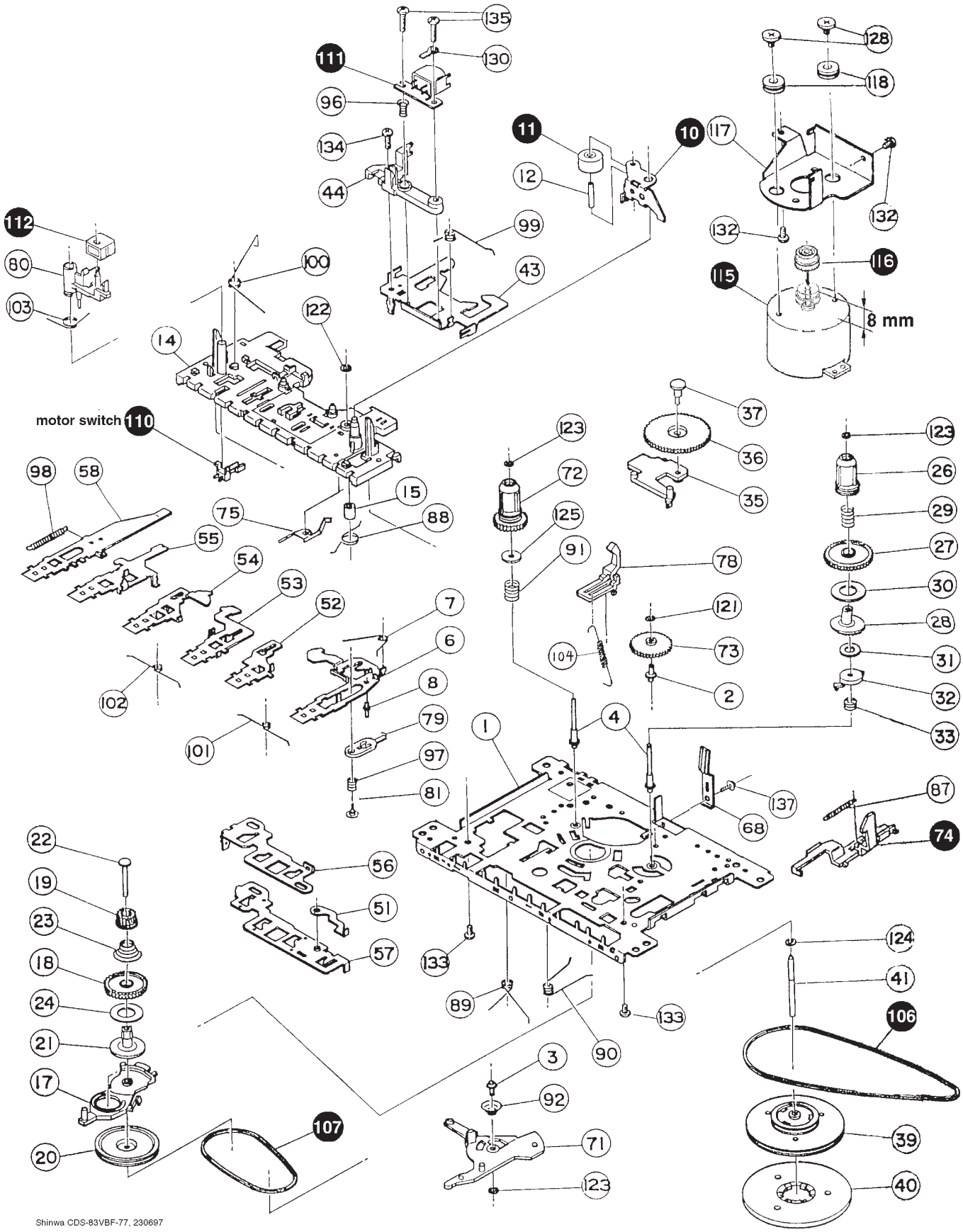
## EXPLODED VIEW / DRAWING 2




MECHANICAL PARTS

| | | |
|---|---|---|
| 403 | 4822 529 10322 | DAMPER, DOOR |
| 426 | 4822 443 10833 | CD DOOR, BLACK |
| 426 | 4822 443 10819 | CD DOOR, SILVER |
| 427 | 4822 532 12798 | CD CLAMP |
| 428 | 4822 535 60096 | DAMPING DISC CD |
| 429 | 4822 410 11506 | KNOB EJECT CD DOOR, BLACK |
| 429 | 4822 410 11507 | KNOB EJECT CD DOOR , SILVER |
| 431 | 4822 492 11058 | SPRING, EJECT CD DOOR |
| 432 | 4822 402 10723 | LEVER, EJECT CD DOOR |
| 433 | 4822 691 10654 | CD-DRIVE, *CD94-V5-T1* (Mabuchi motors) |
| 434 | 4822 529 10386 | RUBBER DAMPER CD DRIVE, REAR |
| 436 | 4822 529 10387 | RUBBER DAMPER CD DRIVE, FRONT |
| 437 | 4822 492 71653 | SPRING, OPEN CD DOOR |

# EXPLODED VIEW TAPE TRANSPORT




**Only those parts of which a service code number is stated are normal service parts.**

| | | |
|---|---|---|
| | 4822 691 10612 | TAPE TRANSPORT **CDS-83VBF-77** |
| 10 | 4822 528 70849 | PINCH ROLLER ARM |
| 11 | 4822 528 70695 | PINCH ROLLER ASSY |
| 74 | 4822 403 70968 | EJECT HOOK |
| 106 | 4822 358 31325 | MAIN BELT |
| 107 | 4822 358 31124 | SUB BELT |
| 110 | 4822 278 90721 | LEAF SWITCH, MOTOR ON/OFF |
| 111 | 4822 249 30218 | REC/PB-HEAD, MS18R-AKONI |
| 112 | 4822 249 40306 | ERASE HEAD, TDK6PA |
| 115 | 4822 361 21656 | MOTOR, EG-530AD-9B |
| 116 | 4822 528 81497 | MOTOR PULLEY |

# ELECTRICAL PARTSLIST

MECHANICAL PARTS

| | | |
|---|---|---|
| 0001 | 4822 256 90463 | HOLDER FERRITE BAR |

MISCELLANEOUS

| | | |
|---|---|---|
| 1250 | 4822 277 11739 | SWITCH SLIDE, MODE |
| 1302 | 4822 267 31468 | SOCKET HEADPHONE 3,5mm Jack |
| 1350 | 4822 276 12648 | SWITCH PUSH, DBB |
| 1626 | 4822 277 11504 | SWITCH SLIDE, REC/PB |
| 1800 | 4822 276 13114 | TACT SWITCH |
| 1801 | 4822 276 13114 | TACT SWITCH |
| 1802 | 4822 276 13114 | TACT SWITCH |
| 1803 | 4822 276 13114 | TACT SWITCH |
| 1804 | 4822 276 13114 | TACT SWITCH |
| 1807 | 4822 276 12889 | DOOR SWITCH |
| 1820 | 4822 135 00151 | LCD |

CAPACITORS

| | | | | | |
|---|---|---|---|---|---|
| 2101 | 4822 122 33195 | 100pF | 10% | 50V | |
| 2102 | 4822 122 33848 | 47pF | 5% | 50V | |
| 2103 | 4822 124 40248 | 10µF | 20% | 63V | |
| 2104 | 4822 124 40248 | 10µF | 20% | 63V | |
| 2105 | 4822 122 33191 | 22pF | 5% | 50V | |
| 2106 | 4822 125 50681 | VARCO TUNING | | | |
| 2108 | 4822 126 13508 | 3p3 | 10% | 50V | |
| 2109 | 4822 126 13674 | 27pF | 5% | N330 | |
| 2110 | 4822 126 12229 | 8,2pF | N750 | 50V | |
| 2112 | 4822 124 41397 | 47µF | 20% | 25V | |
| 2113 | 4822 126 13581 | 0,22µF | 20% | 50V | |
| 2114 | 4822 126 12787 | 330pF | 10% | 50V | |
| 2115 | 4822 124 40246 | 4,7µF | 20% | 63V | |
| 2116 | 4822 121 43144 | 22nF | 10% | 50V | not for USA |
| 2116 | 4822 121 43145 | 33nF | 10% | 50V | only for USA |
| 2117 | 4822 124 40242 | 1µF | 20% | 63V | |
| 2118 | 4822 124 40242 | 1µF | 20% | 63V | |
| 2119 | 4822 121 43144 | 22nF | 10% | 50V | not for USA |
| 2119 | 4822 121 43145 | 33nF | 10% | 50V | only for USA |
| 2120 | 4822 124 40242 | 1µF | 20% | 63V | |
| 2121 | 4822 124 40239 | 0,47µF | 20% | 63V | |
| 2122 | 4822 124 40239 | 0,47µF | 20% | 63V | |
| 2250 | 4822 124 40746 | 0,22µF | 20% | 63V | |
| 2251 | 4822 124 40746 | 0,22µF | 20% | 63V | |
| 2252 | 4822 122 33197 | 1nF | 10% | 50V | |
| 2274 | 4822 124 40246 | 4,7µF | 20% | 63V | |
| 2301 | 4822 121 51387 | 10nF | 20% | 16V | |
| 2302 | 4822 121 51387 | 10nF | 20% | 16V | |
| 2303 | 4822 124 40746 | 0,22µF | 20% | 63V | |
| 2304 | 4822 124 40746 | 0,22µF | 20% | 63V | |
| 2305 | 4822 124 41407 | 0,47µF | 20% | 63V | |
| 2306 | 4822 124 41407 | 0,47µF | 20% | 63V | |
| 2307 | 4822 124 40433 | 47µF | 20% | 25V | |
| 2308 | 4822 124 40246 | 4,7µF | 20% | 63V | |
| 2309 | 4822 122 10466 | 220pF | 10% | 50V | |
| 2310 | 4822 122 10466 | 220pF | 10% | 50V | |
| 2311 | 4822 124 40433 | 47µF | 20% | 25V | |
| 2312 | 4822 124 40433 | 47µF | 20% | 25V | |
| 2313 | 4822 124 41407 | 0,47µF | 20% | 63V | |
| 2314 | 4822 124 41407 | 0,47µF | 20% | 63V | |
| 2315 | 4822 123 14025 | 2200µF | 20% | 16V | |
| 2317 | 4822 124 81029 | 100µF | 20% | 25V | |
| 2319 | 4822 124 41997 | 470µF | 20% | 10V | |
| 2320 | 4822 124 41997 | 470µF | 20% | 10V | |
| 2625 | 4822 122 33197 | 1nF | 10% | 50V | |
| 2626 | 4822 122 33197 | 1nF | 10% | 50V | |

CAPACITORS

| | | | | |
|---|---|---|---|---|
| 2627 | 4822 126 13507 | 91pF | 5% | 50V |
| 2628 | 4822 126 13507 | 91pF | 5% | 50V |
| 2629 | 4822 124 41579 | 10µF | 20% | 50V |
| 2630 | 4822 124 41579 | 10µF | 20% | 50V |
| 2631 | 4822 126 11714 | 4,7nF | 20% | 16V |
| 2632 | 4822 126 11714 | 4,7nF | 20% | 16V |
| 2633 | 4822 122 10466 | 220pF | 10% | 50V |
| 2634 | 4822 122 10466 | 220pF | 10% | 50V |
| 2635 | 4822 124 40433 | 47µF | 20% | 25V |
| 2636 | 4822 124 40433 | 47µF | 20% | 25V |
| 2637 | 4822 126 13098 | 5,6nF | 20% | 16V |
| 2638 | 4822 126 13098 | 5,6nF | 20% | 16V |
| 2639 | 4822 122 33197 | 1nF | 10% | 50V |
| 2640 | 4822 122 33197 | 1nF | 10% | 50V |
| 2641 | 4822 126 11585 | 22nF | 20% | 50V |
| 2642 | 4822 126 11585 | 22nF | 20% | 50V |
| 2650 | 4822 124 41584 | 100µF | 20% | 10V |
| 2651 | 4822 124 41596 | 22µF | 20% | 50V |
| 2652 | 4822 121 43054 | 1,8nF | 10% | 50V |
| 2653 | 4822 124 40433 | 47µF | 20% | 25V |
| 2654 | 4822 121 51387 | 10nF | 20% | 16V |
| 2655 | 4822 121 51387 | 10nF | 20% | 16V |
| 2657 | 4822 122 33197 | 1nF | 10% | 50V |
| 2658 | 4822 122 33197 | 1nF | 10% | 50V |
| 2800 | 4822 122 33197 | 1nF | 10% | 50V |
| 2801 | 4822 124 40242 | 1µF | 20% | 63V |
| 2802 | 4822 121 51387 | 10nF | 20% | 16V |
| 2803 | 4822 124 40433 | 47µF | 20% | 25V |
| 2804 | 4822 126 12878 | 1,5nF | 10% | 16V |
| 2805 | 4822 121 41854 | 150nF | 10% | 63V |
| 2806 | 4822 122 33519 | 470pF | 10% | 50V |
| 2807 | 4822 122 33191 | 22pF | 5% | 50V |
| 2808 | 4822 124 40433 | 47µF | 20% | 25V |
| 2813 | 4822 126 12339 | 2,2nF | 10% | 16V |
| 2814 | 4822 126 13677 | 39pF | 5% | 50V |
| 2815 | 4822 121 51387 | 10nF | 20% | 16V |
| 2816 | 4822 124 41407 | 0,47µF | 20% | 63V |
| 2817 | 4822 122 10577 | 3,3nF | 10% | 16V |
| 2818 | 4822 124 40242 | 1µF | 20% | 63V |
| 2819 | 5322 121 42386 | 100nF | 5% | 63V |
| 2820 | 4822 121 43526 | 47nF | 5% | 100V |
| 2821 | 4822 124 41579 | 10µF | 20% | 50V |
| 2822 | 4822 126 11585 | 22nF | 20% | 50V |
| 2823 | 4822 124 40246 | 4,7µF | 20% | 63V |
| 2824 | 4822 124 41407 | 0,47µF | 20% | 63V |
| 2825 | 4822 122 10462 | 15pF | 5% | 50V |
| 2826 | 4822 124 41407 | 0,47µF | 20% | 63V |
| 2827 | 4822 124 40433 | 47µF | 20% | 25V |
| 2828 | 4822 124 41579 | 10µF | 20% | 50V |
| 2829 | 5322 121 42489 | 33nF | 5% | 100V |
| 2830 | 4822 122 10319 | 82pF | 5% | 50V |
| 2831 | 4822 121 41856 | 22nF | 5% | 250V |
| 2832 | 4822 124 41576 | 2,2µF | 20% | 50V |
| 2833 | 4822 124 40433 | 47µF | 20% | 25V |
| 2834 | 4822 126 12882 | 100nF | 20% | 50V |
| 2835 | 4822 122 33195 | 100pF | 10% | 50V |
| 2836 | 4822 124 12068 | 220µF | 20% | 10V |
| 2837 | 4822 122 33197 | 1nF | 10% | 50V |
| 2838 | 4822 122 33197 | 1nF | 10% | 50V |
| 2839 | 4822 122 33191 | 22pF | 5% | 50V |
| 2840 | 4822 124 40433 | 47µF | 20% | 25V |
| 2841 | 4822 122 33195 | 100pF | 10% | 50V |
| 2843 | 4822 126 13098 | 5,6nF | 20% | 16V |

# ELECTRICAL PARTSLIST

CAPACITORS

| | | | | |
|---|---|---|---|---|
| 2844 | 4822 122 33195 | 100pF | 10% | 50V |
| 2846 | 4822 122 33197 | 1nF | 10% | 50V |
| 2848 | 4822 122 33197 | 1nF | 10% | 50V |
| 2850 | 4822 126 12882 | 100nF | 20% | 50V |
| 2851 | 4822 126 11714 | 4,7nF | 20% | |
| 2852 | 4822 126 11714 | 4,7nF | 20% | |
| 2854 | 4822 122 33195 | 100pF | 10% | 50V |
| 2855 | 4822 122 33195 | 100pF | 10% | 50V |
| 2856 | 4822 122 33195 | 100pF | 10% | 50V |
| 2859 | 4822 121 51387 | 10nF | 20% | 16V |
| 2860 | 4822 124 40433 | 47µF | 20% | 25V |
| 2871 | 4822 126 11714 | 4,7nF | 20% | |
| 2873 | 4822 126 12882 | 100nF | 20% | 50V |
| 2874 | 4822 122 33197 | 1nF | 10% | 50V |
| 2880 | 4822 122 33197 | 1nF | 10% | 50V |
| 2891 | 4822 121 51387 | 10nF | 20% | 16V |
| 2892 | 4822 124 40433 | 47µF | 20% | 25V |
| 2893 | 4822 124 40433 | 47µF | 20% | 25V |
| 2895 | 4822 124 40242 | 1µF | 20% | 63V |
| 2896 | 4822 124 40242 | 1µF | 20% | 63V |

RESISTORS

| | | | | |
|---|---|---|---|---|
| 3101 | 4822 100 20167 | 50kΩ TRIMPOT. LIN. | | |
| 3102 | 4822 116 52297 | 68kΩ | 5% | 0,5W |
| 3104 | 4822 116 52256 | 2,2kΩ | 5% | 0,16W |
| 3106 | 4822 116 52231 | 820Ω | 5% | 0,5W |
| 3107 | 4822 116 52191 | 33Ω | 5% | 0,5W |
| 3113 | 4822 116 52234 | 100kΩ | 5% | 0,5W |
| 3114 | 4822 116 52234 | 100kΩ | 5% | 0,5W |
| 3207 | 4822 116 52191 | 33Ω | 5% | 0,5W |
| 3208 | 4822 116 52191 | 33Ω | 5% | 0,5W |
| 3209 | 4822 116 52234 | 100kΩ | 5% | 0,5W |
| 3300 | 4822 101 11826 | 2x50kΩ LIN., VOLUME POTMETER | | |
| 3301 | 4822 116 52256 | 2,2kΩ | 5% | 0,16W |
| 3302 | 4822 116 52256 | 2,2kΩ | 5% | 0,16W |
| 3303 | 4822 116 52243 | 1,5kΩ | 5% | 0,16W |
| 3304 | 4822 116 52243 | 1,5kΩ | 5% | 0,16W |
| 3305 | 4822 116 83883 | 470Ω | 5% | 0,16W |
| 3306 | 4822 116 83883 | 470Ω | 5% | 0,16W |
| 3307 | 4822 116 52219 | 330Ω | 5% | 0,5W |
| 3308 | 4822 116 52219 | 330Ω | 5% | 0,5W |
| 3309 | 4822 116 52238 | 12kΩ | 5% | 0,5W |
| 3310 | 4822 116 52249 | 1,8kΩ | 5% | 0,16W |
| 3311 | 4822 116 52249 | 1,8kΩ | 5% | 0,16W |
| 3313 | 4822 116 52206 | 120Ω | 5% | 0,5W |
| 3314 | 4822 116 52206 | 120Ω | 5% | 0,5W |
| 3315 | 4822 116 83864 | 10kΩ | 5% | 0,5W |
| 3316 | 4822 116 83864 | 10kΩ | 5% | 0,5W |
| 3551 | 4822 116 52256 | 2,2kΩ | 5% | 0,16W |
| 3552 | 4822 116 52256 | 2,2kΩ | 5% | 0,16W |
| 3553 | 4822 116 83961 | 6,8kΩ | 5% | 0,16W |
| 3554 | 4822 116 83961 | 6,8kΩ | 5% | 0,16W |
| 3625 | 4822 116 83883 | 470Ω | 5% | 0,16W |
| 3626 | 4822 116 83883 | 470Ω | 5% | 0,16W |
| 3627 | 4822 116 52264 | 27kΩ | 5% | 0,5W |
| 3628 | 4822 116 52264 | 27kΩ | 5% | 0,5W |
| 3629 | 4822 116 83883 | 470Ω | 5% | 0,16W |
| 3630 | 4822 116 83883 | 470Ω | 5% | 0,16W |
| 3631 | 4822 116 52219 | 330Ω | 5% | 0,5W |
| 3632 | 4822 116 52219 | 330Ω | 5% | 0,5W |
| 3633 | 4822 116 52272 | 330kΩ | 5% | 0,5W |
| 3634 | 4822 116 52272 | 330kΩ | 5% | 0,5W |
| 3635 | 4822 116 83961 | 6,8kΩ | 5% | 0,16W |
| 3636 | 4822 116 83961 | 6,8kΩ | 5% | 0,16W |

RESISTORS

| | | | | |
|---|---|---|---|---|
| 3637 | 4822 116 52264 | 27kΩ | 5% | 0,5W |
| 3638 | 4822 116 52264 | 27kΩ | 5% | 0,5W |
| 3639 | 4822 116 83864 | 10kΩ | 5% | 0,5W |
| 3640 | 4822 116 83864 | 10kΩ | 5% | 0,5W |
| 3641 | 4822 116 52228 | 680Ω | 5% | 0,5W |
| 3642 | 4822 116 52228 | 680Ω | 5% | 0,5W |
| 3643 | 4822 116 52175 | 100Ω | 5% | 0,5W |
| 3644 | 4822 116 52175 | 100Ω | 5% | 0,5W |
| 3645 | 4822 050 11002 | 1kΩ | 5% | 0,2W |
| 3650 | 4822 116 52213 | 180Ω | 5% | 0,5W |
| 3651 | 4822 116 52272 | 330kΩ | 5% | 0,5W |
| 3652 | 4822 116 83961 | 6,8kΩ | 5% | 0,16W |
| 3653 | 4822 116 52213 | 180Ω | 5% | 0,5W |
| 3654 | 4822 116 83868 | 150Ω | 5% | 0,5W |
| 3655 | 4822 116 52184 | 18Ω | 5% | 0,5W |
| 3656 | 4822 111 30893 | 4,7MΩ | 5% | 0,2W |
| 3800 | 4822 116 52176 | 10Ω | 5% | 0,5W |
| 3801 | 4822 050 24708 | 4,7Ω | 1% | 0,6W |
| 3802 | 4822 116 52175 | 100Ω | 5% | 0,5W |
| 3803 | 4822 116 81154 | 2,2Ω | 5% | 0,5W |
| 3804 | 4822 116 83868 | 150Ω | 5% | 0,5W |
| 3805 | 4822 116 52175 | 100Ω | 5% | 0,5W |
| 3806 | 4822 116 52256 | 2,2kΩ | 5% | 0,16W |
| 3807 | 4822 116 52271 | 33kΩ | 5% | 0,16W |
| 3808 | 4822 116 52263 | 2,7kΩ | 5% | 0,5W |
| 3809 | 4822 116 52276 | 3,9kΩ | 5% | 0,5W |
| 3810 | 4822 050 11002 | 1kΩ | 5% | 0,2W |
| 3811 | 4822 111 30893 | 4,7MΩ | 5% | 0,2W |
| 3812 | 4822 116 52257 | 22kΩ | 5% | 0,5W |
| 3814 | 4822 116 52257 | 22kΩ | 5% | 0,5W |
| 3817 | 4822 116 52234 | 100kΩ | 5% | 0,5W |
| 3819 | 4822 117 11825 | 1,5MΩ | 5% | 0,4W |
| 3820 | 4822 116 52252 | 180kΩ | 5% | 0,5W |
| 3821 | 4822 116 52243 | 1,5kΩ | 5% | 0,16W |
| 3822 | 4822 116 52264 | 27kΩ | 5% | 0,5W |
| 3823 | 4822 116 52234 | 100kΩ | 5% | 0,5W |
| 3824 | 4822 116 83868 | 150Ω | 5% | 0,5W |
| 3825 | 4822 116 83883 | 470Ω | 5% | 0,16W |
| 3826 | 4822 116 83961 | 6,8kΩ | 5% | 0,16W |
| 3827 | 4822 116 52243 | 1,5kΩ | 5% | 0,16W |
| 3828 | 4822 116 52238 | 12kΩ | 5% | 0,5W |
| 3829 | 4822 116 52271 | 33kΩ | 5% | 0,16W |
| 3830 | 4822 116 52244 | 15kΩ | 5% | 0,5W |
| 3831 | 4822 116 52251 | 18kΩ | 5% | 0,5W |
| 3832 | 4822 116 52222 | 390Ω | 5% | 0,16W |
| 3833 | 4822 116 52264 | 27kΩ | 5% | 0,5W |
| 3834 | 4822 116 83872 | 220Ω | 5% | 0,5W |
| 3835 | 4822 116 52184 | 18Ω | 5% | 0,5W |
| 3836 | 4822 050 11002 | 1kΩ | 5% | 0,2W |
| 3837 | 4822 111 30893 | 4,7MΩ | 5% | 0,2W |
| 3838 | 4822 116 52234 | 100kΩ | 5% | 0,5W |
| 3839 | 4822 116 52235 | 1MΩ | 5% | 0,5W |
| 3840 | 4822 050 11002 | 1kΩ | 5% | 0,2W |
| 3841 | 4822 116 52298 | 680kΩ | 5% | 0,5W |
| 3842 | 4822 116 52297 | 68kΩ | 5% | 0,5W |
| 3843 | 4822 116 52222 | 390Ω | 5% | 0,16W |
| 3844 | 4822 116 52291 | 56kΩ | 5% | 0,5W |
| 3845 | 4822 116 52239 | 120kΩ | 5% | 0,5W |
| 3846 | 4822 050 11002 | 1kΩ | 5% | 0,2W |
| 3847 | 4822 116 52257 | 22kΩ | 5% | 0,5W |
| 3849 | 4822 116 83872 | 220Ω | 5% | 0,5W |
| 3850 | 4822 116 52283 | 4,7kΩ | 5% | 0,5W |
| 3851 | 4822 116 52244 | 15kΩ | 5% | 0,5W |
| 3852 | 4822 116 83883 | 470Ω | 5% | 0,16W |

# ELECTRICAL PARTSLIST

RESISTORS

| | | | | |
|---|---|---|---|---|
| 3853 | 4822 116 52244 | 15kΩ | 5% | 0,5W |
| 3854 | 4822 116 52243 | 1,5kΩ | 5% | 0,16W |
| 3855 | 4822 116 52271 | 33kΩ | 5% | 0,16W |
| 3856 | 4822 116 52303 | 8,2kΩ | 5% | 0,5W |
| 3857 | 4822 116 52269 | 3,3kΩ | 5% | 0,5W |
| 3858 | 4822 116 80176 | 1Ω | 5% | 0,5W |
| 3859 | 4822 116 83864 | 10kΩ | 5% | 0,5W |
| 3860 | 4822 050 18208 | 8,2Ω | 1% | 0,4W |
| 3861 | 4822 050 18208 | 8,2Ω | 1% | 0,4W |
| 3862 | 4822 116 52269 | 3,3kΩ | 5% | 0,5W |
| 3863 | 4822 116 52219 | 330Ω | 5% | 0,5W |
| 3864 | 4822 116 52256 | 2,2kΩ | 5% | 0,16W |
| 3865 | 4822 116 52256 | 2,2kΩ | 5% | 0,16W |
| 3866 ⚠ | 4822 052 10828 | 8,2Ω | 5% | 0,3W |
| 3867 ⚠ | 4822 052 10338 | 3,3Ω | NFR25 | |
| 3868 | 4822 116 80176 | 1Ω | 5% | 0,5W |
| 3869 | 4822 116 83883 | 470Ω | 5% | 0,16W |
| 3870 | 4822 116 52257 | 22kΩ | 5% | 0,5W |
| 3871 | 4822 050 11002 | 1kΩ | 5% | 0,2W |
| 3872 | 4822 116 83882 | 39kΩ | 5% | 0,5W |
| 3873 | 4822 116 52257 | 22kΩ | 5% | 0,5W |
| 3874 | 4822 116 83872 | 220Ω | 5% | 0,5W |
| 3875 | 4822 116 52256 | 2,2kΩ | 5% | 0,16W |
| 3876 | 4822 116 52283 | 4,7kΩ | 5% | 0,5W |
| 3877 | 4822 116 52244 | 15kΩ | 5% | 0,5W |
| 3878 | 4822 116 52228 | 680Ω | 5% | 0,5W |
| 3880 | 4822 116 52207 | 1,2kΩ | 5% | 0,5W |
| 3881 | 4822 116 52257 | 22kΩ | 5% | 0,5W |
| 3882 | 4822 116 83864 | 10kΩ | 5% | 0,5W |
| 3884 | 4822 116 83882 | 39kΩ | 5% | 0,5W |
| 3886 | 4822 116 52235 | 1MΩ | 5% | 0,5W |
| 3887 | 4822 116 83872 | 220Ω | 5% | 0,5W |
| 3888 | 4822 116 83883 | 470Ω | 5% | 0,16W |
| 3889 | 4822 116 83883 | 470Ω | 5% | 0,16W |
| 3890 | 4822 116 83864 | 10kΩ | 5% | 0,5W |
| 3891 | 4822 116 83883 | 470Ω | 5% | 0,16W |
| 3892 | 4822 116 83883 | 470Ω | 5% | 0,16W |
| 3893 | 4822 116 52271 | 33kΩ | 5% | 0,16W |
| 3894 | 4822 116 83883 | 470Ω | 5% | 0,16W |
| 3895 | 4822 116 52276 | 3,9kΩ | 5% | 0,5W |
| 3896 | 4822 116 52276 | 3,9kΩ | 5% | 0,5W |
| 3897 | 4822 116 83883 | 470Ω | 5% | 0,16W |
| 3898 | 4822 116 83883 | 470Ω | 5% | 0,16W |
| 3899 | 4822 050 11002 | 1kΩ | 5% | 0,2W |

COILS

| | | |
|---|---|---|
| 1102 | 4822 526 10176 | FERRITE BAR 5X13X55MM |
| 5101 | 4822 157 70513 | RF COIL 3,5 TURNS |
| 5102 | 4822 157 70731 | COIL, FERR. ANT. (w/o FERRITE BAR) |
| 5104 | 4822 156 30947 | RF COIL 1,5 TURNS |
| 5105 | 4822 157 71145 | COIL VAR., MW-OSC. |
| 5106 | 4822 157 70499 | AM-IF FILTER, 468kHz |
| 5107 | 4822 242 81154 | FILTER KIT, FM-IF |
| 5108 | 4822 156 11146 | AM-IF FILTER, 468kHz |
| 5201 | 4822 526 10494 | FERRITE BEAD |
| 5625 | 4822 157 10371 | BIAS OSC. COIL VAR. 100kHz |
| 5801 | 4822 526 10494 | FERRITE BEAD |
| 5803 | 4822 242 73557 | CERAMIC RES. 8,46MHz |

DIODES

| | | |
|---|---|---|
| 6101 | 4822 130 30621 | 1N4148 |
| 6102 | 4822 130 30621 | 1N4148 |
| 6250 ⚠ | 4822 130 31878 | 1N4003G |
| 6251 ⚠ | 4822 130 31878 | 1N4003G |

DIODES

| | | |
|---|---|---|
| 6252 ⚠ | 4822 130 31878 | 1N4003G |
| 6253 ⚠ | 4822 130 31878 | 1N4003G |
| 6256 | 4822 130 30621 | 1N4148 |
| 6300 | 4822 130 30621 | 1N4148 |
| 6625 | 4822 130 34167 | BZX79-B6V2 |
| 6800 | 4822 130 31881 | BZX79-B3V0 |
| 6803 | 4822 130 30621 | 1N4148 |
| 6804 | 4822 130 30621 | 1N4148 |
| 6805 | 4822 130 31981 | BZX79-C3V9 |
| 6850 | 4822 130 31881 | BZX79-B3V0 |

TRANSISTORS

| | | |
|---|---|---|
| 7102 | 4822 130 44196 | BC548C |
| 7301 | 4822 130 40937 | BC548B |
| 7601 | 4822 130 44196 | BC548C |
| 7626 | 4822 130 40937 | BC548B |
| 7850 | 4822 130 41327 | BC327-40 |
| 7851 | 4822 130 44197 | BC558B |
| 7852 | 4822 130 41327 | BC327-40 |
| 7853 | 4822 130 44196 | BC548C |
| 7854 | 5322 130 60068 | BC558C |
| 7855 | 4822 130 44196 | BC548C |

INTEGRATED CIRCUITS

| | | |
|---|---|---|
| 7101 © | 4822 209 32746 | TEA5711T/N2, RADIO IC |
| 7300 | 4822 209 31544 | TA8227P, POWER AMPLIFIER IC |
| 7625 © | 4822 209 32918 | AN7318S, Rec/Pb-AMPLIFIER IC |
| 7800 © | 4822 209 15932 | TMP47C422F-AZ1010.1, µ-PROC. |
| 7801 © | 4822 209 15952 | M65824FP, SIGNAL PROCESSOR IC |
| 7802 © | 4822 209 32196 | TDA1311AT/N2, DAC |
| 7803 © | 4822 209 90496 | M62475FP, SERVO PROCESSOR IC |
| 7805 | 4822 209 32852 | TDA7073A/N2, MOTOR DRIVER |
| 7806 | 4822 209 32852 | TDA7073A/N2, SERVO DRIVER |